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QUALITY ASSURANCE AT THE DEPARTMENT OF DEFENSE

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BEFORE THE

COMMITTEE ON
GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

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QUALITY ASSURANCE AT THE DEPARTMENT OF DEFENSE

MONDAY, APRIL 10, 1989

United States Senate,
Committee on Governmental Affairs,
Washington, DC.

The Committee met, pursuant to notice, at 10:33 a.m., in room SD-342, Dirksen Senate Office Building, Hon. John Glenn, Chairman of the Committee, presiding.

Present: Senators Glenn and Levin.

OPENING STATEMENT OF CHAIRMAN GLENN

Chairman Glenn. The hearing will be in order.

Our hearing this morning focuses on wasteful Government spending for spare parts in the Department of Defense inventory.

The United States spends over $300 billion a year on defense, and approximately $160 billion of that is for procurement of equipment and services. We have been looking into these logistic areas for a long time. Previously, this Committee has found that the Department of Defense has purchased roughly $30 billion of inventory which by its own definition is not needed for either peacetime use or wartime reserves. DOD calls that "long supply".

The Committee has found that DOD's inventory control system cannot adequately account for the materials we have bought, including serial-numbered missiles that it took us about 6 months to track down at one point. The Committee has issued critical reports on these issues. Today we are taking another step by seeing if the spare parts on the shelf actually work. The answer unfortunately, is often not very well.

This morning we will hear from the Inspector General's Office about the outcome of a 2-year quality check of spare parts on the shelf of Warner Robins Air Logistic Center. Warner Robins is one of five air logistic centers across the Nation, one of 16 DOD wholesale inventory distribution centers.

I will say going in that the results of this audit are extremely disturbing, particularly to this former military pilot. Of the aircraft machine gun parts tested in the sample, only 8 percent conformed to the required specifications—this includes feed chutes, linkage, and things that have to go in to make the system work. When we talk about machine gun parts, we are talking about the whole system. Only 8 percent conformed to the required specifications; 65 percent were so flawed that they are likely to fail early in their service life, or are simply not usable. The remaining 26 percent contain minor defects that should have entitled the Government to at least a reduction in price or some other compensation.

The most disturbing thing is that the parts that are junk or likely to fail include the lower-dollar-value parts in these aircraft—but they are essential. If they fail, the system does not work for these aircraft machine guns.

Using conservative statistical projections, on the machine gun parts tested, it appears that 13 cents out of every dollar was spent for parts that are deeply flawed. In this sample, this is a waste of $14 million.

The bottom line is even worse, however. In a wartime situation we might be fielding aircraft with machine guns that will not work, or that will work only for a very short period of time. That is simply unacceptable. That reduces combat capability. It is not just a waste; it damages our national security.

The IG found that one manufacturer had provided approximately $1.5 million in junk parts and that the manufacturer failed to replace them or to refund the Government. But within months, the Pentagon awarded a new contract to the same manufacturer, because it was the low price bidder. The Defense Department's internal communications failure is astounding in that situation.

Similarly, the audit of aircraft ball bearings disclosed that 31 percent of them were so flawed they are likely to fail; another 31 percent had minor defects, entitling the Government to some reduction in price.

I want to know why we are accepting substandard parts. This is not buying cinder block; we are buying stuff you need when someone is shooting at you, and you need to be able to shoot back.

These examples demonstrate that we have a serious waste and quality assurance problem in our military spares. This is an unacceptable way of doing business. I should also add that these types of audits are not the desired way for us to check product quality. These checks must be made before the products reach the shelf. Quality must be built into the product. Quality assurance checks that we are paying for must be made. And the Pentagon must do a better job of identifying deficiencies.

The IG audit disclosed that many contractors who supply parts lacked the necessary equipment to adequately test the parts they are making. It is also apparent that the Government's quality control function, generally performed by the Defense Logistics Agency's Defense Contract Administration Services, or by service assurance representatives, is not currently performing sufficient spot checks in the final inspection of the parts. Instead of inspecting parts, these agencies are checking paperwork supplied by the contractors.

Obviously, we must find a better way to require quality production, to discover those who are providing defective parts, and to reward those companies who build in quality when letting subsequent contracts.

The Government's existing system of quality deficiency reports, which is designed to provide a tracking mechanism to discover bad products and to make changes, cannot cope with the current marketplace.

Today we will also hear from Jack Katzen, the Assistant Secretary of Defense for Production and Logistics, regarding DOD's policy initiatives to deal with these problems. And we will hear from Air Force and Defense Logistics Agency representatives. I look forward to their testimony.

But it is not enough just to have initiatives underway. DOD seems to always have initiatives underway. We will not accept a situation where our soldiers, our sailors, our airmen or marines are provided with junk parts. This hearing should assist us in learning where we must go from here.

I want to congratulate the Inspector General's Office for the work you have done in this area and your other work as an independent audit of whether things are going right in the procurement and testing of equipment so that it will actually be usable.

So to all of you here this morning, I appreciate your being here and appearing as witnesses.

Before we continue I have a statement by Senator Roth to be placed in the record. He also has some questions for the witnesses to be answered in writing.

[The statement referred to follows:]

OPENING STATEMENT OF SENATOR ROTH

Thank you Mr. Chairman. I want to congratulate you on continuing the Committee's focus on these important defense procurement matters. This Committee does indeed have a long track record on fighting hard to ensure that our service men and women have dependable weapons and related military equipment. Past Committee investigations have uncovered overpriced parts, unreliable weapons, substandard gear in DOD inventories, improper testing procedures, and other examples of mismanagement. Today's hearing will reveal that some of these problems remain.

Continued waste and mismanagement is undermining the public's support for the strong defense which the nation needs to preserve its security. America needs to strive for higher quality in production, manufacturing, and services in all aspects of economic activities. This holds true for the Pentagon as well. Today we see that real reform has not yet arrived at DOD and past practices have continued.

I share the Chairman's concern that despite the many reform efforts of the past few years we still find a high degree of defective parts being procured. As I understand the results of the Defense IG report, his tests of 374 items showed that about 72% or 269 items were supplies which do not work as well as they should. Of these 269 items, 98 were considered to have major nonconforming defects which made the item useless for its intended purpose. How has this happened?

I see in the material provided for this hearing that the Defense IG's report is limited to inspection of items in the DOD Supply System at the Warner Robins Air Logistics Center and I can understand the IG's reluctance to project test results to the entire Federal Supply Group containing these parts, but I wonder how extensive the problem really is. I also wonder if the same problems exist in the other classes of supply such as initial and replenishment spares. In mid-1983, DOD estimated that defective procurement might be as high as 30% of it's weapons budget or roughly $30 billion. In today's times of tight and declining budgets, we can no longer tolerate such sloppy management.

I am happy to see that the Committee will continue to investigate these matters and will seek real reform. Our contract with the Armed Services members who use the procured items and the American taxpayer who pays for them demand that we do so. I stand ready Mr. Chairman to assist in your efforts and welcome the Committee's continued interest in these issues.

Chairman **GLENN**. Our first witnesses will be Derek J. Vander Schaaf, Deputy Inspector General, U.S. Department of Defense.

Mr. Vander Schaaf, we welcome you and your opening statement or an abridged version thereof; in either event, the entire statement will be included in the Committee record.

We appreciate your being here this morning.

TESTIMONY OF DEREK J. VANDER SCHAAF, DEPUTY INSPECTOR GENERAL, U.S. DEPARTMENT OF DEFENSE [1]

Mr. VANDER SCHAAF. Thank you, Mr. Chairman.

I heartily endorse all the remarks you just made. I think they are appropriate and relevant to the issue of non-conforming parts that I am here to talk to you about today.

Nonconforming parts are parts that do not conform to the contract requirements and the specifications laid down in a contract.

We have about $88-89 billion worth of spare parts in the Department of Defense inventory at the present time. When a large percentage, or even a small percentage of those parts are in fact defective or not usable, that represents a lot of waste.

In particular, I want to discuss the audit performed by the IG, DOD at Warner Robins Air Force Base. Even though the scope of the audit was limited, I can draw some conclusions with respect to systemic problems with quality assurance.

The IG, DOD, however, has done considerable other auditing, though not of this exact same nature, at other locations, as has the General Accounting Office. In Appendix D of our report, there is a listing of some of those other audit reports which reflect upon the quality assurance program that the Department uses.

We audited four classes of supplies at Warner Robins Air Force Base to determine if these supplies conformed to the contract requirements. Remember that all of these items, all of these spare parts, had passed all the previous quality checks that were part of the process. They had gone through the entire checking process and were on the shelves and bins at Warner Robins.

We used independent laboratories to do this work. We only tested for essential characteristics. We did not attempt to test for minor flaws in painting or markings or items of that nature. We used test plans that were approved by Air Force engineers. We used a second laboratory when the first laboratory gave us back results indicating parts were nonconforming. In other words, we wanted to make sure the laboratory had not made a mistake.

In all, we did some 6,000 separate tests on 46 different parts. Now, you are probably going to hear from the Department of Defense at some point that our statistics are no good, that my statistician, Dr. Ponti, does not do his job very well. Well, I think we have—if I can say so—a state-of-the-art statistician in Dr. Ponti. He has a Ph.D., and has been in this business for years. He is currently a professor at Drexel, and lecture in statistics at George Washington University, while serving as a statistician to a clothing and textile school in Philadelphia. He has a long history of being an excellent statistician, so I am not particularly worried about the statistics and the projections that we make from the limited samples we used in performing this audit.

We had hoped to do a much broader audit, Senator Glenn, but we were unable to do so. Certain individuals in the Air Force failed to cooperate with us in doing this audit. They appeared to be more concerned with limiting bad news than in identifying spare parts that were nonconforming.

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[1] See p. 42 for Mr. Vander Schaaf's prepared statement.

The lack of cooperation added some 12 to 15 months to the audit. It allowed us to look at only four supply classes instead of the 16 we had hoped to look at. Originally we had proposed to pull 186 different items from the shelves, but we were only able to do 46 as a result of poor cooperation. We also would have examined three of the five Air Force Logistics Centers instead of just the Warner Robins Logistics Center.

Chairman **Glenn**. Are further tests underway on those other ones that you had originally planned?

Mr. **Vander Schaaf**. We are in the process of doing test work at the Industrial Supply Center in Philadelphia which will examine a lot of hardware and fastener items. There has been a history of problems with this type part in recent years. We plan to examine electronic components and if we have an opportunity, we will examine some safety and emergency equipment which should be checked. I can discuss that in more detail in the question and answer period.

First, let me define some terms here just a little bit because some of the terminology is not very clear in the detailed DOD directives. Basically we are talking about minor and major nonconformances. In minor nonconformances, you can use the product regardless. In major nonconformances you may have some early wear-out or additional maintenance to perform. The third category is the defective product, one that simply is not usable.

The only recommendation we made in the audit report on which all the parties could agree was that this whole process of definition and guidance that we give to our quality assurance representatives needs to be re-written and redone. I think everybody in the Department is onboard on that aspect of it.

The guidance is somewhat contradictory, to say the least. For example, in one sentence it says, "contracting officers should reject supplies or services not conforming in all respect to the contract requirements." Then you go down two paragraphs and it says, "if the nonconformance is minor in that it does not apply to any of the factors referred to in (c) above, the cognizant contracting administrative officer may make the determination to accept or reject".

It gets into a lot of detail in this definition process, which I think does not assist in identifying the nonconforming parts that we do have.

My prepared statement which you have before you, Mr. Chairman, has tables. It has two pie charts for each of the four categories of supply we looked at.

On page seven, you will see the first pie chart. We have one chart for each category of supply we looked at. One covers the number of parts in the universe and the other covers the dollar value.

Now, in your opening statement you mentioned some of those statistics. If you look at page seven you will see that there are 647,000 parts in the universe of aircraft machine gun parts. We determined that about 423,000 of those had major nonconformances, while 171,000, or 26 percent had minor nonconformances.

The statistics you did not mention in your opening statement are in the next chart, where we take a look at the dollar value. In other words, we are trying to determine if the nonconforming parts are the expensive parts. What is the amount of waste that occurs in this process in terms of parts that are already on the shelves at Warner Robins.

Here, you can see that the major nonconformances represented a far smaller proportion in terms of dollar value. They are about 13 percent, which nonetheless constitutes a tremendous amount of money. We are still talking about $14 million worth of gun parts that are nonconforming. There is a question as to whether they are usable. In fact, we think $12.9 million worth of the $110 million worth of gun parts that are on those shelves at Warner Robins are simply not usable and it would be a mistake to try and insert those into an aircraft.

Chairman GLENN. Could I just interrupt long enough to ask a question here. What is the difference between "major" and "minor" nonconformance?

Mr. VANDER SCHAAF. A major nonconformance, would—as a rule—fail prematurely in combat. A major nonconformance probably would not fit properly; it might not even function properly.

The difficulty is that the quality assurance program does not identify those long-term failures, those latent defects. If the mechanic installs a part, and it does not fit immediately, he knows he has got a problem, and we are liable to get corrective action. On the other hand, if the major nonconformance is somewhat hidden or latent, you have great difficulty in getting the corrective actions back into the system, Senator.

Then the next two charts cover the next supply class that we addressed in this audit, and that supply class is entitled "mounted bearings". These mounted bearings are, of course, critical in various uses in tactical fighters, everything from landing gears to rotor heads on helicopters to flaps on aircraft. Practically anything that moves with precision in some way uses mounted bearings.

Here, we have a major nonconformance of about one-third of the sample—or one-third of the universe. We are talking about a much smaller universe of parts. We are talking about 2,400 parts, with about one-third non conforming, one-third totally conforming, no defects at all, and then roughly another third having major nonconformances.

When you look at page 10, and you look at it in terms of the dollar value, you find that mounted bearings again tend to reflect the one-third allocations as we did in the spare parts. They tend to have about a third of the dollar value of major nonconformances, a third conform, and a third have minor nonconformances. Again, the dollar value of the universe at Warner Robins is considerably smaller than the universe of gun parts. It is about $400,000.

The next two charts reflect the third category that we tested, fastener hardware. Those two charts are on pages 12 and 13 of my prepared statement.

Here, we find major nonconformances as a percent of the number of parts in the universe to be relatively small. However, the major nonconformances as a percent of dollar value reached almost 44 percent, or $19,000 out of a relatively small universe at this particular logistics center. There were only $43,000 or $44,000 worth of fastener hardware that this logistics center managed.

Most of the fastener hardware is managed by the Defense Industrial Supply Center in Philadelphia. They have about $1.2 billion worth of fastener hardware in that facility. We are in there auditing now, doing the same kind of audit, using the same kind of techniques and the laboratory work. Particularly we are in there because we have noticed and had a number of criminal convictions of suppliers of bolts.

Chairman **Glenn**. Could you define the fastener a little better for us? Are these the spring-loaded Zeus fastener-type things, or——

Mr. **Vander Schaaf**. They are primarily bolts, but they have a special function. They are unique to an Air Force function and probably unique to an aircraft that is managed by the Warner Robins Air Logistics Center.

Like this little bolt, this is a $20 bolt. The chamfer to help you insert it into where it fits—the rotor boom that drives the rear propeller of the HH3 helicopter—has not been chamfered. There is a likelihood that the mechanic when he inserts it into place—and he has to line up a number of these bolts—could misalign it and shear the threads.

Chairman **Glenn**. And what is the chamfer area, the extended area, then—it lets you insert it in the hole so it cannot——

Mr. **Vander Schaaf**. It inserts in the hole partly so you can get it lined up easily, and then you tighten it.

Chairman **Glenn**. So it cannot be cross-threaded.

Mr. **Vander Schaaf**. That is right, so you do not cross-thread the bolt. A visual inspection of this bolt can tell you that the chamfer it is not there. You can pick up the bolt and see the chamfer is not there.

The Industrial Supply Center in Philadelphia, has 55 Federal stock classes. We have already pulled a sample involving 20 of those Federal supply classes. We will examine bolts and electrical wire in particular, because we have had a number of criminal convictions in those areas. In addition, we will be able to look at such things as bearings, unmounted bearings, chain and wire rope, screws, studs, nuts and washers, nails, keys, pins, and all kinds of other fastening devices including, nonelectrical wire, steel wire, and so forth. So we intend to take this process considerably further than we have to date.

I want to add that the Defense Logistics Agency has cooperated with us to a very large extent. They have been straight with us all the way. They have a completely different attitude than some Air Force officials had during the Air Force portion.

Finally, the last two charts I have in my statement reflect the results of testing hand tools. There, we had no major nonconformances. We had some problem though because some suppliers did not provide us with the proprietary data we needed in order to run the lab tests. As a result there is a large untested category. We did try to do some functional tests on, I believe, it was a crimper. The hand tool did appear to work as it was supposed to. Results look better for these parts, although there are some minor nonconformances in these hand tools.

Chairman **Glenn**. These are wrenches, pliers, special tools?

Mr. **Vander Schaaf**. Yes. But these tools tend to be special-purpose, because they are managed by the particular Air Logistics Center at Warner Robins. They probably have a special handle on them to reach a part deep inside an aircraft engine or in an aircraft itself. If they were standard hand tools, they would be managed by a different organization.

Now, one of the problems I want to bring to your attention, Senator, is the high degree of minor nonconformances. As you can see from the statistics I just presented, it is a pervasive, but very subtle problem, and it bothers us.

In our sample, those parts that had minor nonconformances were worth about $90 million on a projection basis. Frankly, I think the Department should have received some sort of consideration for accepting those minor nonconformances. They should have been identified by the manufacturer in the first place, and we should have negotiated some sort of price reduction.

I believe that would be an additional way to put a little pressure on contractors to improve the quality of their production processes in order to enhance their ability to make a good return on their work.

Well, there are a number of levels of quality, that ought to be mentioned here. We buy most items, not necessarily spare parts, in what we call basic quality inspection. It is covered in Part 46 of the Federal Acquisition Regulations. It is simply using commercial-type inspection processes.

Then, we have a mil spec, which we call a military inspection process. In that process, the contractor has to have an approved inspection system before we will buy from him. We use Government employees to go into the facility on a regular basis, or they may be there on a permanent basis, to make sure that the system the contractor uses conforms to a spec called 45208A.

Then there is an even higher category I should mention that the gun parts I have in front of me all had this higher level of inspection, and they got on the shelves going through that process.

The third level is called Military Quality Inspection 9858A, and in that level of quality, we are looking at nuclear reactor parts and items where it is very critical for the part to be problem free. We did not have any parts in our sample that require this third level of inspection.

I want to emphasize to you that these parts did go through the second level of inspection.

Now, there are some 9,860 quality assurance people who are employed by the Department of Defense, doing their job and trying to keep this system that we use alert and working. I think most of them are attempting to do their job well.

I think the system, however, does not always work as well as it should. In fact, it is obvious that the system does not work. But it is not necessarily the problem of the quality assurance representative. Many of the items we simply do not test. We do not have the time or the facilities to do it, and it is the contractor's responsibility to build the quality into his products.

We rely upon the integrity of the contractor to give us a quality product, and that is the way it should be. It is the way it has to be, Mr. Chairman.

Our auditors and engineers visited 15 contractors associated with some 32 contracts. In other words, we went out and tried to go to those contractors who showed up with major nonconformances in our sample. We tried to find out what was wrong and why the contractor had quality problems.

What we found is that sometimes contractors did not have adequate test fixtures or adequate test equipment. In some cases, the prime contractor did not perform scheduled quality assurance of subcontractors. Much of this equipment is subcontracted down the line, and one of the items we pay for is to have the prime contractor go out there and inspect the subcontractor from time to time. That is built into the system, and it simply was not being done.

In fact, a whole batch of one of these parts is so terribly far off spec that they are all going to be junked.

Chairman GLENN. What is that particular part?

Mr. VANDER SCHAAF. It is a retainer partition. It holds the ammo rounds inside the drum, and there are literally dozens of these in the drum. I can look at it with my eye and see that the holes in the back are a completely different size. You do not need any micrometer or measuring device to see these kinds of problems. They are apparent.

Chairman GLENN. This is what—linkages for ammunition, or——

Mr. VANDER SCHAAF. No. The ammo in this particular case is not linked. It is held in the drum by these retainers, and as it spins around, it comes down a track and is taken into the gun through another part here. Yet when they demonstrated this for our auditors, this retainer partition simply would not hold the ammunition in the drum. The ammunition simply fell down. The mechanic, of course, would catch this particular item. The auditors tell me we paid $36 apiece. In total, the retainer parts cost $382,000 and must be junked.

Obviously, the nonconformance should have been detected. These parts went through a subcontractor, and then through a major prime contractor. There is no excuse for not detecting these.

Chairman GLENN. What happens when they don't work? Does the gun stop?

Mr. VANDER SCHAAF. In this case, hopefully, it would be caught before the gun was used. If these parts don't work, yes, you get a stoppage. That is a likely result of some of these other parts I have in front of me. A very definite likely result, in our opinion.

Chairman GLENN. What do you mean—it would come from inspection. If they had been used as spares, you would not know it until you tried to use the gun and it did not work, would you?

Mr. VANDER SCHAAF. That is correct.

A couple more points. There were some inadequate inspection practices performed, or no inspections, in a couple of places. And then we found some poor manufacturing processes. A lack of control of the cutting tools, for example were found at some facilities. We used some IG engineers to help us identify some of those problems.

I do want to say that the contractors involved were very cooperative about this. All 15 that we visited cooperated with us. They corrected the items. They recognized where they had problems and did not fight what we were trying to do in any respect. It is important to note that cooperation.

Chairman **Glenn**. Did those parts meet the mil spec?

Mr. **Vander Schaaf**. No, they do not meet the spec, but they got through the system.

Chairman **Glenn**. Well, the question I was leading up to was do they meet the spec, but not work, so we need to change the spec, or did they just flat not meet the spec and so never should have been accepted to begin with?

Mr. **Vander Schaaf**. They did not meet the spec, Senator. We only tested against the specs. We used the specs and went to the laboratories. We had one part, I think, in the bunch where the spec was in fact wrong. We identified that process as well. I do not believe this was the one.

Chairman **Glenn**. Had the people in the field run into this same problem of using these spares before you got there and ran these separate tests?

Mr. **Vander Schaaf**. I do not know. Mr. C.J. Richardson, why don't you come up to the table?

Chairman **Glenn**. That's fine.

Mr. **Vander Schaaf**. He may know. I do not know. That has not been brought to my attention.

Mr. **Richardson**. On this particular part, it was identified at Luke Air Force Base while our audit was ongoing, and there was a quality deficiency report on this particular part.

Chairman **Glenn**. That they were having problems with it in use?

Mr. **Richardson**. Yes. The mechanic tried to use it and found out that he could not use it and wrote a deficiency report on this particular part.

Chairman **Glenn**. Thank you.

Mr. **Vander Schaaf**. Now, for much of the remainder of my statement, beginning on page 23, I briefly discuss some of the weaknesses in the processes designed to prevent and identify quality problems. Weaknesses found by the audit. They deal with the Materiel Review Boards that are conducted at the contractors' facilities. They just did not keep nonconforming items from recurring. They tended to get into long discussions of whether they ought to pass a particular product forward with minor nonconformances. Yet they did not seem to take adequate steps to go back and ensure that these nonconformances did not recur the next time the item was manufactured.

We think the quality deficiency reporting system is far too slow, and it is not working as it should. It is generally a year or 2 before we start to get any quality deficiency reports. For the most part, people who discover quality deficiencies tend not to want to report them. It is trouble, and it is paperwork to report deficiencies. It is easier to go and pull another item of the same kind off the shelf and hope you get one this time that will fit and function.

Of course, the other problem is, that the quality deficiency system does not have a very good way of identifying latent problems or premature failures. It is just not designed to do that. We think you need to do additional testing of a statistical nature in order to do some of that and identify some of those latent kinds of problems in the process.

The Air Force has started a Contractor Responsibility Review Program. Again, we are not convinced it is working properly. It is built around the quality deficiency reports that are filed by individuals working in the system when they find a part that lacks quality. We found, however, that none of the items that we had identified—I think there were 2 or 3 parts that had quality deficiency reports had filed while we were doing the audit—had in fact reached this group that runs this Contractor Responsibility Review Program. So that program needs to be fixed up in several respects.

On pages 28 and 29, I cited a number of examples on the lack of historical records on quality performance. We do not have systems that identify contractors who have had quality problems on a historical basis. We should give problem contractors more oversight, and in some ways reduce oversight, if you will, at contractors that have good records. Our systems just don't seem to be able to do that to date, and it is something defense managers, I think, will be talking to you about later this morning.

We also believe there is a strong need for an additional testing program to provide timely feedback. We think it can save money. Yes, testing the way we did costs a lot of money, but in the long run we believe it will save money.

Now, the Department has recognized this problem, Senator. I want to make that very clear to you. The current Under-Secretary for Acquisition has a program, called Total Quality Management. It involves a cultural change, in terms of designing and building quality into the products and not trying to do it through inspection. But you still, in our opinion, have to run certain amounts of tests in order to make that happen.

Unfortunately, there is no mechanism in place, to accurately measure progress as we try to instill Total Quality Management. It is a problem not only internal to our own operations in the Department of Defense, but to the operations of the suppliers who provide the Department with spare parts.

With that, I will stop and try to answer any questions you may have, Senator.

Chairman GLENN. Well, thank you very much, for very interesting and somewhat dismaying testimony, to say the least. A number of people in this room, I am sure, have been in actual combat as I have, and you have had guns jam, and you have had things that did not work, and your life is at risk when that happens. And it is not very pleasant to think that here we are in this day and age after all we have learned, still not being able to check up and make sure the parts meet the spec and actually work, which is the most important thing.

The bearings that you mentioned and passed by rather rapidly there, these are on landing gears, helicopter rotors?

Mr. VANDER SCHAAF. Right. They perform different functions. Of the ones we actually tested, we pulled a sample of 10 at random, and then pulled the actual bearings of a given type at random. Here is an example of one. It is a backup emergency generator on the F15 aircraft.

Now, it has an O-ring inserted here which help the bearings to ride. We got in behind that O-ring in the lab tests and looked, and they did not bother to machine and smooth behind the O-ring. When it spins around fast, the O-ring will burn up, and of course, you will have a failure.

Fortunately, this is the auxiliary backup generator for the F15, so it your prime generator is working and providing power, you do not have a problem. You might have a problem if you started up the auxiliary one had your prime power failed, but——

Chairman GLENN. But for a backup generator like that, I assume that the original manufacturer of those backup generators used these same parts; is that correct, or were these different parts, bought from a separate manufacturer, just for replacement?

Mr. VANDER SCHAAF. We have the history on it. I would have to check it. I do not really recall. We will have to provide that for the record.

[The information referred to follows:]

The original manufacturer of the backup generator system, Allied Bendix Aerospace, also manufactures the plate, retaining, and bearing.

Chairman GLENN. Have we had these fail in service?

Mr. VANDER SCHAAF. Let me see here if I can find it. Do you want me to take the time to try to look it up here, or should we provide it for the record? It will probably take a couple minutes.

Why don't I ask my staff to run the history on it, to check and see if the second order of these were provided by the originally manufacturer or were bought from a different sources.

We'll check that for you.

[The information referred to follows:]

We have found no historical record that the plate, retaining, or bearing failed in service. We have no record that it caused the backup generator to fail in service.

Chairman GLENN. What is the type machine gun you are talking about here on this feed mechanism?

Mr. VANDER SCHAAF. I think that is the M61 Vulcan 20-millimeter.

Chairman GLENN. Is that the Gatlin gun, circular?

Mr. VANDER SCHAAF. The Gatlin gun, yes, sir.

Chairman GLENN. That is a very high-speed——

Mr. VANDER SCHAAF. A very, very high rate of fire.

Chairman GLENN. It is 5,000-6,000 rounds a minute, I think, isn't it?

Mr. VANDER SCHAAF. Yes. You do not turn that on for very long, sir.

Chairman GLENN. No; you do not have much ammunition. The point I was going to make was that the supply mechanism, the feed mechanism, is even more critical than it has always been for old 50-caliber and guns like that.

Mr. VANDER SCHAAF. Absolutely.

Chairman GLENN. You stated that 92 percent of the fastener hardware had minor nonconformances. Now, that might not be life-threatening, but what are the implications of having almost all of these parts not meting the specifications called for by the contract? Ninety-two percent.

Mr. **Vander Schaaf**. When you put them all together, the chances of stoppages or failures are great. I suppose one can argue that even if you have a stoppage or a failure of an aircraft gun, you can still complete a sortie. The gun is not critical on every mission, and there are a lot of missions you can do without a gun. But I will tell you—and you know better than I do, since you are an old pilot—if you are going to fly by visual rules of engagement, you want to have that gun functioning. Those Sidewinders and Sparrows and other missiles might be great, but you want that gun up and operating if you are going to use visual rules. If you have 92 percent of the parts with nonconformances, I think the likelihood of failure is great.

I do not know if the Air Force witnesses here this morning have any statistics on gun failures. If they keep good statistics that can be tracked. I am sure they do.

Chairman **Glenn**. You state that the IG had originally planned on reviewing three of the Air Force Air Logistics Centers, but that only one audit actually took place. Could you give us more information on that?

Mr. **Vander Schaaf**. Yes, sir. We had what I would call a lack of cooperation by the Air Force. We announced this audit in September of 1986. We took nine items from the shelves at Warner Robins, working with their own engineers and Air Force laboratory facilities. Six of the nine parts in our survey came out nonconforming.

We then said that we were going to go further with this audit, we were going to conduct a full audit. We announced an audit of 186 items to be sampled, and the word came back from the Air Force that, "We are not going to support this audit. It is too voluminous. We cannot afford to give you the spare parts that you will need from our shelves. It is going to take too much time."

In fact, the Acting Assistant Secretary of the Air Force for Logistics wrote me a letter and said, "It is going to take 93,400 hours of test time to do this audit for you."

And we said wait a minute—93,000—how is that possible?

The Air Force responded that it was "going to take $10,000 to test each and every one of these spare parts."

And we said wait a minute, that sounds ridiculous.

Anyway, we bickered over that for a good period of time. We did not get anywhere with this audit so we asked them to give us the backup for their estimates. When the Assistant Secretary provides you with information of that nature you assume that he has some backup. We never could find it, and finally they decided that it was lost and they could not provide information supporting their estimates.

So it went on and on like that. I finally went to see the Deputy Secretary of Defense, Mr. Taft, in June 1987, and I said we intended to do this audit. I had no choice but to elevate the matter. At that point in time, we did not have an Inspector General in the Department. I said I was going to issue a 7-day letter, something in the Inspector General's Act that allows us to inform the Congress if we are having problems along this line. I intended to issue that letter unless the audit got underway.

Mr. Taft assured me that he would take action; he did. He talked to the Secretary of the Air Force, and we got going, but it was not until September of 1987 that we got this audit back on track. We had lost about 10 months at that point.

And it went on like that. Then the Air Force said they could not provide us the testing facilities. So we used the DLA and their series of independent labs for testing these parts.

Chairman GLENN. Well, did the Air Force say that they had already tested these things, or that they had control when they came out, or they had tested these to see whether they met spec or not; or was there any reason why they did not? I would think they would welcome a test to make sure that the parts that are going to be used in combat would work.

Mr. VANDER SCHAAF. I would think so, too. I would just suggest you ask them to explain that situation.

Chairman GLENN. I will.

Mr. VANDER SCHAAF. I have the documentation and the letters here that the Air Force sent me on this. I cannot really comment, other than to say it appeared to me that they were more interested in not getting bad publicity than they were in fixing the problem. Their priorities were just out of whack in this case. I hope they have changed their priorities now.

Chairman GLENN. Of the parts you picked, did you have some advance warning, did you have some reason to believe that these were the worst situation, or were these parts picked at random? And the obvious follow-up to that is are we going to run into the same kind of nonconformance across-the-board as we run checks on other parts.

Mr. VANDER SCHAAF. These were picked purely at random. In fact we had, as I have said, 16 supply classes we wanted to check at Warner Robins. We only did these four, because we started there early in the survey. I think I can tell you we are going to find additional quality problems as we continue this process.

Now, there are two areas, as I mentioned earlier, where I hope we find that the stuff off the shelves has been fixed. That is in electrical wire and in certain automotive bolts. We have identified those as being problems nationwide, and we have had criminal indictments and convictions in those areas. So that should have caused the Department to inspect and look at all of that material and get it off the shelves. It is one of the reasons we want to look at that kind of material.

Chairman GLENN. Each service either keeps or is supposed to keep an inventory of failures as new equipment is put in, or as equipment goes through its whole life cycle, so that you know what to procure.

Do you get those reports, and have you followed up on any of those? There may be some failure rates even worse than these that you ran into by random.

Mr. VANDER SCHAAF. Yes. In the audit, we did not look at that process. We looked at these individual items. We would not normally get that, but we looked for those reports on these items to see if they were there. I believe two items had quality deficiency reports, but they were filed during the pendency of the audit. They were not on record before we started the audit. At that point they had known we had selected those items and removed them from the shelves for testing.

Chairman **Glenn**. These you found had failure rates in the field that were being discovered at the time you were running your checks.

Mr. **Vander Schaaf**. This item here actually failed in the field while we were doing this audit.

Chairman **Glenn**. Okay. Because as far as nonconformance to spec, then I have got to come back on the other side and ask is there a chance that we are over mil specking these things. Are we writing specs that are more than are needed for certain parts, and that is the reason they are in nonconformance—they will do the job, but they are in nonconformance as far as the fine print goes on the contract.

Mr. **Vander Schaaf**. I think there clearly is that possibility. There is one item in here, a mounted bearing for the F15 landing gear, which is clearly out of specification by the tests. On the other hand, we had to agree, that after looking at all of the data, it did not make any difference. In other words, the specification required very, very high tolerances and they were not necessary. The manufacturer agreed that those tolerances were not necessary. But we paid a lot of extra money to have that spec written and that bearing made to those tolerances. We should not have done so. We have got to, of course, identify items of that nature as well.

I believe that was the only one of the 46 we checked which fell into that category.

Chairman **Glenn**. Why shouldn't the FAR be amended to say if a contractor provides nonconforming parts to the Government without informing the Government in advance of delivery—and they should know that if they are testing them; if they are not, they should be testing them—then the Government should be entitled to recovery of the cost of the contract with penalty regardless of when the defect is discovered?

Is there any reason why that should not be included in the FAR?

Mr. **Vander Schaaf**. Well, yes, if there is no intent. If there is intent, that is effectively included in the criminal laws of this country, sir. As you may know, product substitution is our number one criminal investigation priority. We go after cases of product substitution. We focus our resources on that.

I talked to this Committee back in September of 1987 about product substitution, and since September 1987, we have had 84 more convictions, involving 29 contractors and 54 or 55 individuals, I believe, for product substitution. I guess that is as of December of 1987, or about a 15-month period.

If we think there is some intent, either failure to test, or giving us substitute products with knowledge on the part of the supplier, we pursue those cases criminally. We have been quite successful in that.

Chairman **Glenn**. I know, but I do not want to get over into intent so much here as I do that they are supposed to certify that these parts are workable—right?

Mr. **Vander Schaaf**. That is correct. And these were built to that second category of inspection process in which they have a quality assurance program in-house which says they will not give us nonconforming parts. And they obviously are giving us lots of parts with minor nonconformances, and many with major nonconformances.

Chairman GLENN. Thank you.

Senator LEVIN. Just on the Chairman's point, as I understand our current system, the Government accepts these parts; is that correct—there is an acceptance of these parts?

Mr. VANDER SCHAAF. That is correct.

Senator LEVIN. And the acceptance once made removes the responsibility of the manufacturer in the absence of fraud; is that generally right?

Mr. VANDER SCHAAF. That is correct. Some manufacturers, depending on their internal scruples, agree to replace items—but many times they say, "Hey, you bought it; let the buyer beware; it is yours."

Senator LEVIN. But our acceptance is premised on an assumption that there has been an inspection by the contractor.

Mr. Vander Schaaf. Yes, either an inspection or the application of quality assurance rules applied by that contractor which should give reasonable assurance that defective items do not pass through his system.

Senator LEVIN. And we have approved those rules.

Mr. VANDER SCHAAF. Yes. We go in and inspect and validate that contractor's quality assurance program.

Senator LEVIN. So we have either approved the quality assurance program or in some other way have satisfied ourselves that the contractor's inspection has taken place.

Mr. VANDER SCHAAF. That's correct. In many cases we even do some inspections, sample testing and inspecting, by quality assurance representatives.

Senator LEVIN. But is it not true, then, that with this larger percentage of defects, our assumption is defective?

Mr. VANDER SCHAAF. Yes. I guess the short answer to that, Senator, is yes.

Senator LEVIN. Now, we have either got to do one of 2 things, it seems to me. We have either got to change our assumption, or we have got to require a warranty despite acceptance.

In other words, we have either got to make sure these parts are inspected and not assume it anymore, based on approval of a quality assurance program, go in and inspect them ourselves or require—either that, before we accept them we have got to require inspection by our own people, or it seems to me we have got to insist on a warranty.

What are you recommending to cure this kind of a problem? We have an endemic problem here.

Mr. VANDER SCHAAF. We are not recommending inspection of every item; I think that would be impossible.

Senator LEVIN. How about every tenth item, every hundredth item?

Mr. VANDER SCHAAF. Yes. We are recommending statistical sampling similar to the ones conducted by our audit. We think it would pay. We do not think there is enough inspection in the system.

Senator LEVIN. And what are the services' responses to that recommendation?

Mr. VANDER SCHAAF. I think it was one of nonconcurrence. It is regarded as too expensive, and supposedly the current system works. But I do not know what their attitude or approach will be here this morning. They are coming behind me.

Senator LEVIN. Without getting ahead of the game, what has been their approach until this morning? Have they rejected that proposal?

Mr. VANDER SCHAAF. Yes. And I think they sometime reject it out of the belief—and I think it is a proper belief, but it does not always work—that you have to build quality into the manufacturing process. We have to change the attitudes and maybe the processes. Our manufacturers have to be sensitive to deviations from the standard. They have to keep narrowing that deviation down.

But you have got to have a way to measure it from time to time, and that is what we really do not have in place.

Senator LEVIN. But you would agree that we have either got to find a way to get inspection done properly, or we have got to require a warranty despite acceptance. Those are the two courses, it seems to me, that are open to us.

Mr. VANDER SCHAAF. I have no problem with an implied warranty on something like this. I mean, when a part is so far off spec, and it clearly does not work, the contractor ought to take back non-conforming parts and either provide us with the proper ones, or give us our money back. We can then go buy parts somewhere else.

Senator LEVIN. But do you see any other option to correct the problem here which the Chairman has identified; do you see any other solution to either put in place an inspection system of some kind which will guarantee us quality assurance, or to require some kind of a warranty despite acceptance on our parts? Do you see any other alternative to cure this problem?

Mr. VANDER SCHAAF. And random testing of parts.

Senator LEVIN. That is an inspection system.

Mr. VANDER SCHAAF. Okay, if that is your definition of an inspection. It is currently not part of the inspection system.

Senator LEVIN. I know. I am giving you two remedies.

Mr. VANDER SCHAAF. Okay.

Senator LEVIN. Are there any other ones besides some kind of an inspection system, random or some other inspection?

Mr. VANDER SCHAAF. Okay. There are subsets of those approaches, but you are basically right. The third one—and we have it, but it is not working as well as it should—is quality deficiency reporting from the field. The reports technically come up through the system, with people in the Logistics Centers paying attention to those quality deficiency reports and then feeding them back to our contracting officers so they can build histories on contractors who have records of providing nonconforming parts. That system is not working well, and I think the Defense witnesses will back me up 100 percent on that.

Senator LEVIN. That might have an effect on future parts, too. But I am talking about a remedy for this particular problem that we have identified.

Mr. VANDER SCHAAF. Of not getting these parts on the shelf in the first place? You are right, Senator.

Senator LEVIN. Okay. Now, going to the question of fraud, is it your understanding that if there is fraud, the fact that we have accepted them under the current system does not eliminate the manufacturer's responsibility.

Mr. VANDER SCHAAF. That is absolutely right.

Senator LEVIN. And does fraud include grossly negligent inspection?

Mr. VANDER SCHAAF. Absolutely.

Senator LEVIN. So it does not have to be intentional.

Mr. VANDER SCHAAF. Yes, but we are never very effective in getting such cases into a court of law. Whether we have ever done so, I would have to go and check the convictions.

Senator LEVIN. Without getting into the convictions, would you let us know for the record whether or not the fraud which will permit us to recover against a manufacturer despite our acceptance of the product, does that fraud include grossly negligent inspection. That is question number one for the record.

Number 2, where the manufacturer should have known that parts were deficient, would that be fraudulent within the meaning of the exception to the rule that once we have accepted, the manufacturer is no longer responsible?

Would you let us know on those two questions?

Mr. VANDER SCHAAF. I will try to answer those questions for the record, Senator.

[The information referred to follows:]

Criminal action cannot be brought against a manufacturer for grossly negligent inspections of delivered and accepted goods because gross negligence does not meet the requisite intent required for criminal prosecution. Likewise, criminal prosecution cannot be brought against a manufacturer "who should have known" that the parts delivered and accepted were different.

There are, however, several contractual remedies available to the Government when dealing with goods already accepted but tainted by fraud, grossly negligent inspections or defective goods which the manufacturer knows are deficient.

In general, FAR 46.2, "Inspection Clause," requires the contractor to maintain an inspection system acceptable to the Government. The failure to maintain an adequate quality assurance system may impact the responsibility standards set forth in FAR 9.104-1. The Inspection Clause is located at FAR 52.246-2 (fixed-price supply); FAR 52.246-4 (fixed-price service); FAR 52.246-7 (fixed-price research and development); FAR 52.246-12 (fixed-price construction); FAR 52.246-3 (cost reimbursement supply); and FAR 52.246-5 (cost reimbursement service).

Under the Inspection Clause, FAR 46.2, the Government has the right to inspect work performed during the course of performance or before acceptance; the right to require correction, replacement, or rework of nonconforming tenders or to equitably reduce the contract for default if the contractor fails to correct directed deficiencies.

According to FAR 52.246-2(K), "Inspection of Supplies—Fixed Price," inspections and tests by the Government do not relieve the contractor of responsibility for defects or other failures to meet contract requirements before acceptance. Acceptance shall be conclusive, except for latent defects, fraud, gross mistakes amounting to fraud, or as otherwise provided in the contract.

Once the product has been accepted, the Government's remedy is to revoke acceptance based upon fraud or to revoke acceptance based upon gross mistake amounting to fraud. By showing constructive fraud versus actual fraud, the Government must show a major mistake so serious it would not be expected of a reasonable contractor. Once the Government can show fraud or gross mistakes amounting to fraud, the Government can avail itself of all those remedies outlined in the Inspection Clause or file claims against the manufacturer under 41 U.S.C. S604

If a contractor has a history of fraudulent or poor performance, the Government can debar or suspend the contractor making them ineligible for award. FAR 9.405(a). Contracts can only be awarded to contractors who are responsible. FAR 9.103(a). The contracting officer must make a responsibility determination prior to award. FAR 9.103(b). Part of the responsibility determination made by the contracting officer is to determine whether the contractor has a satisfactory performance history and quality assurance program. If the contractor cannot meet quality standards, the manufacturer will be ineligible for award.

In addition to the above listed contract remedies, the contract should be checked for warranty clause and liquidated damages clauses. These contract clauses often provide additional redress against the manufacturer. A latent defect theory also provides a basis for recovery.

Lastly, although the fraud exhibited by the manufacturer may not reach the "intent" standard required for criminal prosecution, there may be sufficient evidence to pursue the matter under the Civil False Claims Act, 31 U.S.C. S3729 or The Program Civil Fraud Remedies Act of 1986.

Senator LEVIN. My final question has to do with commercial products. Is it safe to say that if we purchased more commercial products, off-the-shelf products, that we would have a lower rate of nonconformance?

Mr. VANDER SCHAAF. I cannot make that statement, but I have a feeling we probably would. But for much of what we buy, that option simply is not available. For all the parts I have in front of me here today, that option is simply not available to us.

Senator LEVIN. I understand that. I am not suggesting it is——

Mr. VANDER SCHAAF. Now, I will be able to give you a better answer on that when we finish our audit at the Defense Industrial Supply Center. There, we are looking at commercial-like, standard items. Then I can more fully answer your question.

Senator LEVIN. Well, I will answer my own question. I do not think the defect rate on commercial parts is anywhere near what it is on these parts that are prepared according to our specifications. Now, we have done enough research on that, frankly, on my staff to know that the expectation of defects on commercial parts is so close to zero where you still have a warranty on it that the answer is, frankly, dramatically different. But if you will——

Mr. VANDER SCHAAF. I have a feeling you are correct, but I do not have any empirical data to back it up.

Senator LEVIN. Well, we will provide some for you.

Mr. VANDER SCHAAF. Okay.

Senator LEVIN. Thank you, Mr. Chairman.

Chairman GLENN. Thank you, Senator Levin.

How many times, to your knowledge, has the Department of Defense forced a contractor to either remanufacture defective parts or refund the money?

Mr. VANDER SCHAAF. It is done to a rather limited degree. I think it is basically done in those cases that go through the criminal courts and criminal prosecution.

There are other examples, I am sure, and there are contractors who have made refunds, but it is not a routine way of doing business.

Chairman GLENN. Well, the DOD directive on quality programs states that future contracts should not be awarded to contractors providing nonconforming parts. Is that guidance being followed?

Mr. VANDER SCHAAF. As I have said, Mr. Chairman, the systems are not in place to actually carry that out. What you can run into, however, are contracting officers who tend to go with the prime contractor in the belief that a prime contractor—and I am talking about a major defense contractor—is more likely to provide a better part than a sub or smaller contractor. The data that we have here though, does not indicate that at all. There are major contractors who provide good parts and there are major contractors who provide bad parts. The same thing holds true for small contractors.

I get worried when we start to implement programs where we are going to only deal with responsible contractors. We must ensure that we do not drive our contracting officers to avoid opportunities to save money by going directly to suppliers rather than buying through major contractors. We have good data to support these concerns.

Chairman GLENN. Is there one place in the Pentagon where information on contractors who have not performed properly is brought together so that contracts can be checked? In other words, if the Army buys something that is deficient, the Air Force should not turn around and on somebody who has not performed correctly, give a contract to the same people all over again.

Mr. VANDER SCHAAF. No, sir. Those systems do not interface with each other very well at all. It really becomes a problem when the contractor has dealt with three or four agencies in the Department of Defense and then deals with the Department of Transportation or the National Aeronautics and Space Administration. The Government's ability to feed that information back and forth is really poor.

I mention one example in my statement. The company is AMEX Corporation. It was not related to this audit, but we were involved for a couple of years. AMEX produced electrical components and circuit boards that were nonconforming for the Army, the Navy, the Air Force, the Federal Aviation Administration, and the Coast Guard. Yet no one had really talked to anyone else about this, and AMEX continued to get contracts, even though they had a very poor-quality system in that facility.

After we brought it to the attention of the Defense Logistics Agency DLA began to work on that, and we pulled all of the agencies together.

So there is no system that ties this thing together very well.

Chairman GLENN. Well, I would think we are on the way to establishing one, I hope.

We are going to have to move right along here, because we do want to hear from other witnesses here this morning. You have given us a lot to think about, and we have read your statement and will be keeping in touch with you on these things.

I think these are things that not only should not be fought by those in the services; they should be welcomed, because to me these are so important. There is only one reason for having a Department of Defense, obviously, and that is how it performs in combat. And that means the equipment that is provided has to work. All of the rest of this as to the niceties of whether there is intent or not—if you are out there in an airplane, and you are jousting with an anti-aircraft position or something, which is supposed to be against the rules but they do it anyway in combat, and if you are coming in on that thing and your guns do not work, it is your life. It is combat efficiency, and it is not anything else but that.

As I said in my opening statement, this is not buying cinder block for someplace where it flakes off a little bit after 10 years; it is whether we can conduct war or not, and there is no other reason for having a Pentagon.

So thank you very much, and we will want to be keeping in touch. This is excellent testimony this morning.

Mr. **Vander Schaaf**. Thank you, Senator.

Chairman **Glenn**. The next panel is the honorable Jack Katzen, Assistant Secretary of Defense for Production and Logistics; Brigadier General M. J. Pepe, United States Army, Defense Logistics Agency; and Major General Richard D. Smith, United States Air Force, Materiel Management, Air Force Logistics Command.

We welcome you here this morning, gentlemen. You have all been in the room and have heard the testimony this morning, so we look forward to your comments on this.

The statements you have, if they can be abridged so we can spend as much time discussing it, we would appreciate that. In either event, your entire statements will be included in the record as though delivered.

Mr. Katzen, if you would lead off for us, please.

TESTIMONY OF JACK KATZEN, ASSISTANT SECRETARY OF DEFENSE FOR PRODUCTION AND LOGISTICS, U.S. DEPARTMENT OF DEFENSE, ACCOMPANIED BY BRIG. GEN. M.J. PEPE, U.S. ARMY, DEFENSE LOGISTICS AGENCY, AND MAJ. GEN. RICHARD D. SMITH, U.S. AIR FORCE, MATERIEL MANAGEMENT, AIR FORCE LOGISTICS COMMAND

Mr. **Katzen**. Mr. Chairman, before we discuss the subject report, I believe it is appropriate to briefly discuss the quality philosophy.

We have finally recognized that we cannot legislate quality. Quality is obtained through a comprehensively-controlled process.

In the past we thought that the way to obtain quality was to write additional specifications and standards and to add more inspectors to ensure the results. That approach is doomed to failure.

We have spent the last decade increasing requirements in our specifications, and it has not worked. Adding more inspectors and auditors does not solve the problem; it only adds to the reject rates and to the cost.

DOD is currently focusing attention to process controls in an effort to preclude nonconformance. DOD's main thrust is to implement the quality philosophy through Total Quality Management (TQM). TQM vastly expands the concept of quality from strictly inspecting and testing to designing and manufacturing quality into the product. Total Quality Management is both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization.

TQM is the application of quantitative methods and human resources to improve the materials and services supplied to an organization, all the processes within an organization, and the degree to which the needs of the customers are met, now and in the future.

Our goal is a cultural change from the mind-set of conformance to minimum requirements to continuous quality improvement, which will simultaneously achieve cost reductions. TQM stresses building quality into the product and focuses on defect prevention, rather than relying on finding defects after the fact, thereby eliminating waste, scrap and rework.

The process has been proven in some of the largest companies—Ford, Motorola, Hewlett Packard and others, as well as in some of our Services' organic facilities.

In an effort to instill TQM concepts properly, we have begun the training process at the top level of DOD management. For instance, the Defense Systems Management College is conducting seminars and workshops for top management; in February, fifty of the Pentagon's top leaders attended a day and a half TQM implementation session.

I have reviewed the draft report and the responses provided by the Defense Logistics Agency (DLA) and the Services. It should be noted that even though the Air Force and DLA have disagreements with the findings as stated in the draft report, corrective action has been initiated in many areas. We will review the final report, resolve any disagreements, and respond appropriately.

I am encouraged by the fact that the IG has identified no safety or super-critical issues. Most parts, with a few exceptions, were fully usable; therefore, wholesale changes are not justified. Corrective action has already been taken to preclude recurrence of those nonconformances validated.

We will review very carefully the evaluation criteria used by the DOD IG, versus contractor criteria, to verify statistical validity of sample items and the extrapolation of sample results to the population as a whole.

The IG recommendations to my office, ASD(P&L), are workable and consistent with ongoing efforts to implement TQM. However, to address the problem in the long term, the DOD is taking the following actions:

We are proceeding to institutionalize Total Quality Management through top-down support and grassroots training.

We are moving from "inspection after the fact" when it is too late to do anything about the quality of the product to "in-process controls" within the design and manufacturing processes.

We are improving reporting on deficiencies and product design and integrating the automated reporting system to cross-feed the information, exactly as you discussed earlier.

As you know, I am personally an enthusiastic pursuer of TQM and was one of the first in this country to understand and apply its principles. Institutionalizing TQM throughout DOD and its contractors at all tiers is my first priority.

Since this effort can do more for war fighting capability and the budget than anything else we can do, I am quite dedicated to its thorough implementation. TQM is the most effective tool to eliminate the entry of nonconforming items into our inventory.

That concludes my prepared statement, and we are ready for questions.

Chairman GLENN. Thank you.

General Smith, do you have any comment you wish to make?

General SMITH. No, sir.

Chairman GLENN. General Pepe?

General PEPE. No, Senator.

Chairman GLENN. Mr. Katzen, I have a little problem here seeing how TQM is something new and revolutionary and is going to solve all of our problems. Now, I go back a long way in the military—more years than I like to admit at this point—and back when we were trying to mandate some of these highly complex and technical systems years ago, we called it "ZD" at that time, "zero defects."

Now, it is just hard for me to believe we have come along, 20 or 25 years later, and we are just discovering that quality assurance comes from that kind of interest in what the equipment is going to be used for—and we are discovering this as though TQM is something new and different that we have just discovered, and it is going to work, and it is going to be beautiful—meanwhile, we've got a bunch of garbage going out that will not work in combat.

Now, we can change philosophy over a period of time, but how are we going to get the parts out there right now? Right now, if we went to war, we would be handicapped by the fact that we've got some less-than-certifiable parts—less-than-operable parts.

So we can't wait for TQM. How are you going to do it?

Mr. KATZEN. I think we can wait for TQM, because TQM——

Chairman GLENN. Not if I am going into combat with the part you are supplying, we are not.

Mr. KATZEN. We will be getting results from TQM very quickly.

With respect to what we have in stock, we have to examine what we have, look at what is good, and what is not, and sort it out. We are meeting now to undertake such a process.

However, you are right, we do have a transition problem with respect to what we have in stock and what is coming in, and we are attending to that very thoroughly, believe me.

Chairman GLENN. Mr. Vander Schaaf testified that in one case involving a 30-millimeter gun, the same contractor who supplied these worthless parts was awarded a contract to supply a complex safety-critical part for the F16.

What steps are you taking or is DOD taking to ensure that information about a contractor's prior poor-quality performance is exchanged between the services so we do not just repeat this?

Mr. KATZEN. I believe General Pepe can address that.

Chairman GLENN. Fine. General.

General PEPE. Sir, we have a considerable number of initiatives that are ongoing now to do several things—number one, to tighten up the way we oversee quality at our contractors' facilities because within DLA, through our Defense Contract Admin Services Region, we play a major role, if you will, in assuring that we get quality parts out there in our logistics pipeline.

Secondly, we are doing that, if you will, through better training for our people, by taking a look at the current policies and procedures that we have ongoing and tightening them up, because they could require some tightening up to comply with today's environment, if you will, in terms of the changing industrial base as well as the dynamics that exist within our industrial base.

We are also doing a lot in our depot system within DLA to better assure that the parts that are on our shelves are of quality. And in fact we are instituting an independent lab system to also double-check the quality of the parts that we have, which parallels what the DOD IG has done. We are going to take that and provide results back to our region commanders who are responsible for the Contract Admin Services within many of our contractor facilities, provide them feedback that they have not had before, and at least with that feedback, we believe it is going to play an important part in at least helping us to identify where some of the shortcomings are in our current system so that we can in fact tighten up and better assure quality material in our DOD pipeline.

Chairman GLENN. Are there cases where we have actually refused future contracts because of prior failure to deliver spec parts?

General PEPE. Sir, one of the initiatives we have ongoing at the front end is what we call our Quality Vendor Program. What we are doing is giving increased weight in our source selection or vendor selection process to a contractor's prior performance as a basis for making an award. In that particular program, there have been cases where we went to other than the lowest bid price contractor because the lowest bid price contractor did not have an adequate track record of quality, and we have gone to other than the apparent low bidder.

Chairman GLENN. Have we ever refused contracts, though, because of past failure to perform. You are just saying that will be given some weight in future considerations. Have we ever refused?

General PEPE. Sir, I would have to go back and check with our contracts people and provide that for the record.

[The information referred to follows:]

a. Contractor: Z. T. Precision.
Cage Code: OBXB1.
PAS Info: Negative February 15, 1989. Quality Unsatisfactory—not in full compliance with MIL-I-45208.
Awarded to: Aerospace Engine Parts.
b. Contractor: Tool & Die Industry.
Cage Code: 9N177.
PAS Info: Negative January 18, 1989. Quality Unsatisfactory—Method C Inspection involved. Method C lifted in March 1989.
Awarded to: Columbia Manufacturing.
c. Contractor: Datum Machining Services.
Cage Code: 3W456.
PAS Info: Negative February 16, 1989. Quality Unsatifactory—not in compliance with MIL-Q-9858A.
Awarded to: Methods Inc.
d. Contractor: Alton Iron Works Inc.
Cage Code: 84027.
PAS Info: Negative October 3, 1988. Quality Unsatisfactory—Method C Inspection involved. Method C lifted in November 1988.
Awarded to: Uniroyal Plastics Co.

General PEPE. The Defense Logistics Agency is committed to doing business with contractors who have demonstrated an ability to provide conforming parts. The agency will discontinue doing business with those who have not demonstrated an ability or willingness to provide conforming material. The Agency has several top priority initiatives in place, which result in not awarding contracts to poor producers. We have made substantial progress in this area, and will continue to direct top management attention toward continued improvement. During calendar year 1987-88, the following firms were debarred for past failure to provide quality parts:

Morris Hardware Co. Inc., 3015 Darnell Rd., Philadelphia, PA 19154.
Hardware and Metal Ind., 2614 Aviation Parkway, P.O. Box 534027, Grand Prairie, TX 75053.
ATCO Industries Inc., 6309 Fifteen Mile Rd., Sterling Heights, MI 48077-2955.
NOVA Fasteners, International Screw, P.O. Box 37, 3580 Oceanside Rd., Oceanside N.Y. 11572.
ESCO Fasteners Co. Inc., 3580 Oceanside Rd., Oceanside, NY 11572-5829.

MISCO Inc., 2501 Ludelle St., P.O. Box 50667, Fort Worth TX 76105.
ACRO-Missile, 351 Camer Dr., Bensalem, PA 19020.

The following is a partial list of firms that were denied contracts during 88 because of the history of poor quality performance. This list was obtained from the Defense Construction Supply Center, one of six Agency buying Centers and is representative of the actions being taken at each of the Centers:

Eagle Bob Tail Tractors Inc., Grosse Ile, MI.
Windham Power Lifts Inc., HWY 84 W, P.O. Box 468, Elba, AL 36323.
Stewart Avionics Inc., 1785 E. New York Ave., P.O. Box 779, Brooklyn, N.Y. 11207.
AIW-ALTON Iron Works Inc., 1475 Palisado Ave., P.O. Box 20, Windsor, CT 06095-1418.
Conely Co., 4000 S.W. Temple, P.O. Box 7660, Salt Lake City, UT 84107.
AQW Inc., 18 N. Main St., P.O. Box 149, Walton, KY 41094-1111.
Mac International, 1035 S.W. 67th Ave., Miami, FL 33144.
United Metal, Fabricators Inc., 14301 S. Industrial, Ave. Maple Heights, OH 44137.
Springfield Electrical Specialities Inc., DBA Zenith Ignition Inc., 18 Furler St., Totowa, NJ 07512-1802.
Conhagen Alfred Inc., 110 Sylvania Pl., South Plainfield, NJ 07080.
MID-States Tubulars Inc., 107 Mississippi Ave., Crystal City, MO 63019.
Sanders Group, 366 S. Greenwood St., Marion, OH 43302-5106.
Striegel Supply and Equipment Corp., 6001 Chemical Rd., Baltimore, MD 21226.
Georgia Tool and Supply Co. Inc., 738 Broadway, P.O. Box 4448, Macon, GA 31208.
Crosby Valve Corp., Div. of Geosource, Inc. 1463 Brittmore Rd., P.O. Box 19217, Houston, TX 77224.
Sterling Mfg. Co., 2523 Farnam, Omaha, NE 68131-3613.
TITAN Corp., International 11203, Perrin Beitel Rd., San Antonio, TX 78217.
W. B. Fabricators, 805 N. Lincoln Ave., Lakeview, MI 48850.
Diamond Tool and Die Inc., 508 29th Ave., Oakland, CA 94601-2108.
Westside Supply Co., 7700 F St., Omaha, NE 68127-1827.
DRW Mfg. Co., 134 M Water St., P.O. Box 130, West Newton, PA 15089.
Preece Inc., 11 Chrysler, Irvine, CA 92718-2009.
R an L Machine Co., 1164 S. Front, Columbus, OH 43206.
UNAFLEX Rubber Corp., 2056 N. Dixie HWY, Fort Lauderdale, FL 33305-2203.
C-Way Industries Inc., 400 S. Lasalle St., Spencer, WI 54479-9558.

Chairman GLENN. General Smith, have you ever refused future contracts to poor quality contractors?

General SMITH. I am certain we have.

General PEPE. Yes, I am certain we have. I think we can get you examples.

Chairman GLENN. Can you give me some examples?

General SMITH. I can, I am sure, find some for the record, sir. We have refused contracts primarily because of pre-award surveys out of the DCAS organization, and that is based partially on quality deficiency reports in the past. I know we have within the Air Force.

Chairman GLENN. Well, what do you do in a case like this—have we put this contractor on a list so that we will not do any more contracting with them, or do we feel it is our fault for not inspecting them when we accepted those parts?

General SMITH. No, sir. In the particular case that Mr. Vander Schaaf noted and that was in his report, where we received $1.5 million worth of parts that were unusable, and the contractor said, "You bought it, therefore it is yours"—we just blew that one. We should have had that in our contractor responsibility CRRP file—Contractor Review of Responsibility Program file—and we should have then not awarded him another contract, or at least been out and had a pre-award survey.

Chairman GLENN. How about in the contract itself—does it not state in the contract that the parts delivered will be usable, they will be spec, and don't we have any recourse at that point? Once we have accepted delivery, is that the end of it? Is there no further follow-up if the parts do not work?

General SMITH. We have not in our contracts in the past, sir. Beginning in July 1988, we now put what we call a simplified warranty in all competitive contracts that requires that for any nonconformance, if material is discovered to have any nonconformance, the contractor either has to replace the material or refund the contract. We placed that in beginning in 1988. We wanted to make sure that there was not a change in price structure if we did that, and we tried it for a year, and there was no change in the competitive structure. But that is a separate provision we now put in our contracts.

Chairman GLENN. You were afraid at that point that they would run up the price of the contract if they had to deliver what they contracted for to begin with?

General SMITH. Sir, users were not, but sometimes our accountants were. And we checked it, and it did not run the price up, and we now have that as a matter of standard. I think DLA has a similar type provision in their contracts.

Chairman GLENN. Is that standard across all contracting at the Pentagon now, Mr. Katzen?

Mr. KATZEN. Yes.

Chairman GLENN. It is. And it just got included in July of 1988?

General SMITH. That is when we began to use our clause, yes, sir.

Chairman GLENN. What if you have parts like this that are delivered; they are replacement parts, they are not good, they sit in the warehouse—fine, they are there—then we have to start calling on them, and it is 3 years down the road, say. Are you still covered?

General SMITH. No, sir. Our clause covers for one year after acceptance.

Chairman GLENN. Then how do you pick up on things like these machine gun parts that may not be called upon for 2 or 3 years?

General SMITH. Most of our material we would find would at least find some use in the field within 1 year. The part that Mr. Vander Schaaf was showing you, the partition retainer which, of all of the parts he looked at, that is the number one nonconformance—that part did not fit, and we received that under a quality deficiency report from Luke Air Force Base right before the audit began, and it would have gone through the same type of system.

Chairman GLENN. Why would contractors refuse to deal with the Air Force or with the Department of Defense if you insisted on a longer guarantee than just 1 year, when you are buying spare parts, and they may well sit on the shelf until used beyond 1 year?

Mr. KATZEN. Senator, I believe there is a "latent defects" clause somewhere, which would cover that possibility. Could somebody who knows something about that technical point talk to it?

General SMITH. Yes. "Latent defects" would cover forever. The problem is you have to prove it is a latent defect. The reason we went to the expressed warranty was we did not want to argue whether it was a latent or a patent defect, or have lawyers argue about it; we wanted engineers to argue whether there was a conformance or a nonconformance. We thought that was a little easier to resolve. And we could probably extend that on out, Senator Glenn.

We picked 1 year just because we thought most of our parts would come in within a year. I do not think contractors would want a warranty hanging over their head for a lifetime. But I would certainly like to try—as a user, I would like to see our warranty be longer than that.

Chairman GLENN. You bet, and that is just what I was going to say. If I am the guy out there—or if you are out there, General—you have wings——

General SMITH. Yes, sir.

Chairman GLENN [continuing]. If you are out there one of these days, and you have to drive one of these machines over in combat, and you are picking up parts on your airplane that are used as replacement parts that have been on the shelf for 5 years——

General SMITH. I want it to work, sir.

Chairman GLENN [continuing]. And they are every bit as vital—don't give me the 1-year warranty bit; I don't buy that at all.

General SMITH. Yes, sir, yes, sir.

Chairman GLENN. It may not work—and latent defects do not necessarily show that. Latent defects, normally—my understanding of it in the military—is you have a system; it requires some use of that system, and instead of coming out a guarantee, or your overhaul time being 1,000 hours on that system, it turns out your overhaul time is only 100 hours, something like that. They did not design it in good enough, and if you have a latent defects clause, you can go back and renegotiate some things.

But on just a plain old simple spare part like this, I do not think latent defects would pick that up, would it, Mr. Katzen?

Mr. KATZEN. Well, some of our lawyers think it might. I am going to review that situation, though, as soon as I get back home.

Chairman GLENN. All right, good.

How is the TQM going to work, Mr. Katzen? I was around in the "zero defects" days, and I guess I should not bring in personal experience, but there is an old joke among the astronauts that I was thinking about. People quite often ask you what you think about when you are sitting on top of that booster, getting ready to go, and there is a standard answer—we always reply that, well, the last thing you think about before they light it off is how did I get up here on top of this thing built by the lowest bidder on a Government contract.

I guess it is not good to inject any levity into a situation like this—but it indicates that Government contracts for a long time have had the reputation of being less reliable, perhaps, because of the way we contract. And yet here we sit, a quarter of a century later, starting TQM now to replace ZD, which replaced something else, which replaced something else.

This is not a new concept. It is a concept as old as buying things from the contractors. I just do not see how TQM is going to step in here and give our pilots and our air crews and other people who may have to go into combat much confidence that the spare parts are going to really work in combat.

How is it going to work?

Mr. **Katzen**. It works through very practical application of keeping how you design things and how you manufacture things under control, and considering everything with respect to whatever the process is by which you produce a part or complete an end-item, and then analyze that process in great detail, understanding what the limits are. Then ensure that, in fact, your process is controlled so that you are within those limits.

If this is done for every step of a process, you are going to have repeatability, so that whatever is produced will, in fact, be usable. That is a little bit different from the original "zero defects" concept. "Zero defects" did not necessarily relate to total process control.

This is an idea which I first became aware of—I was one of the first persons into Japan early on when I was with the General Electric Company, and I was over there looking for joint ventures. We started eight in Japan, and through some of my buddies in Nomura Securities, I began going through some of the factories that we were talking about possibly doing business with. I was wondering what all this mysterious stuff was on the walls and so forth—and then I learned about Deming and Juran—and you are right, this is not new. In fact, we taught other people how to do this.

I was very surprised when I came to the Pentagon—I have been in my current job almost exactly 1 year—to find out how much could be done for the fighting man and war fighting capability, which is why I measure everything that I do, by TQM, by the application of these very well-known principles. I do not disagree with you at all. In fact, I have exactly the same reaction—why isn't this being used by everybody in this country?

If used properly both in the commercial world and in the military world, this will give those companies that employ it properly the biggest competitive advantage they can possibly have, deriving both from customer satisfaction and reduced cost.

If you go back in history to the driver behind TQM in Japan, you will find that it wasn't that Japan was necessarily after high quality; Japan was trying become competitive low-cost producers. And they found that in their factories, 25 percent of their space and 30 percent of their sales dollars, were wasted. They found that if they did it right the first time and kept doing it right every time, they would become world competitors from a cost basis.

Many of them were just as surprised when they found out that in addition, the gain was an enormous market share. That was an offshoot.

One of the biggest things that we can do today with respect to war fighting capability and cost, I firmly believe, is thorough indoctrination of TQM down to the lowest tiers of suppliers. And along those lines, may I point out, that is also one of our biggest problems, getting good quality systems, good modern quality systems, into our lowest-tier suppliers, where we are spending anywhere between 60 and 80 percent of our dollars.

Chairman **Glenn**. What resources do you have in your office to implement the Total Quality Management Program?

Mr. **Katzen**. We have as many resources as I think I need. Right now I have about 14 people working in the TQM arena. That includes the people who plan the implementation within DOD. We do not actually do the training and the teaching. We do the planning and the policy-writing.

Chairman GLENN. Now, are those 14 people devoted solely to this, to implementing and coordinating these policies?

Mr. KATZEN. Yes.

Chairman GLENN. Because it has been my understanding from some questions we had asked that there was only one person really assigned to this full-time within your office.

Mr. KATZEN. No, that is not true.

Chairman GLENN. And how about the services? Are they implementing this? Do you have people who are involved with this?

Mr. KATZEN. Well, one of the most marvelous things in the world just happened. The Navy has issued a directive over the signature of Larry Garrett, the Under Secretary, that TQM is the way they are going. They have identified their Executive Steering Group For Total Quality Management. This is a first and an enormous plus.

This does not mean that there is not a lot of TQM activity going on in various elements of the Navy. But TQM is now official policy.

Chairman GLENN. Okay. Tell me how you are going to follow up and see whether TQM is working.

Mr. KATZEN. We will be able to tell in our visits to contractors, in their reductions in cost—one of the favorite questions I have is how much are your rework and scrap costs——

Chairman GLENN. What we have been running into, though, is not that kind of a situation. What we have been running into are things where the contractor just sends us stuff, we do not check it, and they do not check it. How is TQM going to improve that?

Mr. KATZEN. If TQM is in place, and they have their processes under control, very little inspection is needed. That does not mean that you do not need inspection at all. We will always need a balance of an audit type of inspection.

But the situation in the world where quality was a separate function—in fact in my business, when I was with General Electric, we never had quality as a separate function. You may remember that I probably still hold today the "on orbit reliability" record. We never felt that it was those people's job to make sure we had quality. Quality was the responsibility of everybody in the business.

Chairman GLENN. Well, I can't quarrel with that. I agree that that is how you get quality. You can have all the good feeling out there in the plant, you can have all the dedication to something, and if there is a design that is not up to spec, somebody has to find it.

Right now, we are not finding it, and the IG testified that we have no methodology in place now for measuring quality improvements resulting from a management change, which is basically what you are talking about with TQM.

If I am out there as a user at the far end of the line, what guarantee am I going to have? Am I going to know that somebody is actually checking these things, is spot checking them, is ferreting out problems like we just had outlined here this morning, or not?

Mr. KATZEN. General Pepe, do you want to answer that?

General PEPE. Sir, the concept of TQM is particularly effective to create a quality product, to be able to use or to repair our weapon systems back out in the field—what we have done as a result of TQM is now we are taking a look at all the processes that are involved and the things that we do within the Defense Logistics Agency, particularly in DCAS.

What we found at our depot system is that we needed a lot of tightening up, because about 80 percent of the parts that we buy are destination-inspected, and in our six depots that we have under DLA's cognizance, those parts flow in, and we have inspectors or receiving inspectors who in fact sign off and say yes, this stuff is there and "meets the requirements."

When we took a look at it, we found out the requirements were not necessarily being met from a specifications standpoint. What we are doing is we have pumped money in already to buy additional test equipment; we are tightening up on the technical inspection——

Chairman **Glenn**. Now you are getting down to what I was just going to ask—are we going to have more inspectors to make sure TQM works? Do we need more personnel; are we budgeting for this?

General **Pepe**. We within the agency are not satisfied that people are going to solve the problem, sir. Right now, we oversee contracts at some 17,000-plus contractors' facilities, and we oversee in excess of 350,000 contracts, or about 350,000 contracts at any given point in time. The question is where is enough enough in terms of people.

What we have got to do is look at our processes and say how do I best utilize the people I have to do a better job. And I really believe we can make major, major inroads in helping to correct those problems by looking at the processes and fixing the processes, not by adding people.

Chairman **Glenn**. But you are going to have to check somewhere. Of the few systems that were checked by the IG, you had 46 separate parts they pulled out—they said they were random—they ran the tests on them and found all the deficiencies we had testimony on here this morning and that are in Mr. Vander Schaaf's report. Now, as we move over to TQM, I hope it works. But it means we still have to do the checking if we are going to know that the product is for real.

General **Pepe**. Senator, if I can, we are doing checking and we are adding checking to the processes because we had not been doing enough checking. But it does not take more people to do the checking.

As an example, we now are instituting an independent lab test, as I said before, to test sample materiel that happens to be on the shelf in our depots. Okay. That we never did before. And you will ask the question: Why not? Well, I do not know the answer to that, either, but it is obvious we need to do more checking.

The second thing is we need to do more checking at the front end, that is, the receiving line, where they receive equipment at our depots to make sure that we glean out those products that in fact are nonconforming.

So we have in fact put test equipment on station at our depots, and we provide more detailed training for our personnel on the receiving stations so that they are better able to identify that products that nonconform.

Chairman GLENN. With what the IG has found, are we going through now and checking other spare parts in areas that are particularly the combat-critical items?

General PEPE. Yes, sir. Let me talk to DLA. What we are doing in terms of labs at the Defense Industrial Supply Center, for example—those fasteners that in fact have been identified by the military services as safety-critical—we have started there. Before we accept those items from vendors, we are in fact taking samples, and we are sending them to the internal lab at the Defense Industrial Supply System to check to ensure they absolutely meet specifications.

Within the Defense Electronics Supply System, we in fact have an internal lab, and we are testing a significant number of items that in fact are being tendered to us at our depots as well as those items that happen to be on the shelf, so we can glean out those things that are nonconforming.

So we are doing a significantly increased amount of testing, and we are starting, if you will, with these items that are critical, that is, safety-critical and will continue to sample from there based upon the most critical items as relates back to combat-readiness.

Chairman GLENN. And you have quality assurance representatives out there in DLA; are you expanding their activities? Are you giving them more equipment to do testing? Are you doing outside contracting testing with various labs? How are you going to do this thing, because obviously we have a lot of material out there that is not combat-ready.

General PEPE. Sir, we are doing all of the above, but we are not now convinced that I need more people. We have about 7,400 of our people, as I said, overseeing some 300,000-plus contracts from a quality assurance perspective. So testing is part of what they are doing.

We are taking another look at how we train our personnel, and we are upgrading our training as well as the programs in instruction and the material content in which it is that they receive.

Chairman GLENN. I am all for TQM; fine, a good follow-on to the old ZD program we had years ago—that's fine. I do not quarrel with that at all. But how are we going to measure it, and how are we going to know it works, and how are we still going to guarantee that the parts are not slipping through TQM?

Somebody has to check the parts, spotcheck them, make sure they not only come up to mil spec, but that they actually work.

Mr. KATZEN. Let me just dwell on the TQM thing for another minute or 2, if I might, to help explain how this works a little better.

After you have a process by which you make something—and there may be a lot of steps to that process—and you have that process under control, you understand exactly what limits should be employed at each one of these steps, you put that product through that process; at the end of that process you test that product thoroughly, and you say this process now produces a product that works well.

What you do then is you don't inspect what comes out at the end; you inspect every part of that process. You actually have a much more thorough inspection process.

Each operator during any part of this process understands what the limits are. Maybe 10 times a day, 30 times a day, depending on what the process involves, the operator has to check that. Records of what the process is or is not doing are generally placed publicly, so that everybody can see whether or not the process is under control.

There is much more inspection under TQM than under a final or cursory in-process inspection system, including everybody who operates on any part of a process is an inspector before he turns over what he is doing to the next person along the line.

One of the most amazing things I remember seeing in Japan was the Nikon camera line, how that works, how people do not just build things, but how they inspect them before they pass them along.

There are many more inspectors in the TQM system than in a general-type inspection system than what we have been used to in the past.

Chairman **Glenn**. Well, I agree with that, and I have been through some of that same experience—you are more of an expert in that area than I am—but I have been in Japanese factories, and I have sat in several meetings where we talked about their quality control and how they do it, and what it comes down to is pride in work, basically. That is what TQM is, taking pride in your job, your work, and you would not dare pass it on to the next guy with a defect in the thing or if it did not come up to the spec that you had been given.

So you are talking about basically pride in work. Now, that is something that takes a while to instill, and I am not sure with the differences in our society and the Japanese that we ever will reach the Japanese level of attention to that, just because of a lot of cultural differences and so on—and we do not want to discuss all of those today.

But I still think if the material is going to be combat-critical material, I am going to feel much better about it, and I am sure you gentlemen are, too, once it goes out there to be used in combat, if somebody has spotchecked this to say yes, it is good stuff, it is the right metal, it is in the right shape, it will work, it is a spare that is as good as the original part was—somebody has to look at that. You cannot just depend on pride in work correcting all of our ills in a decade even, by the time you get TQM fully installed.

We have got a bunch of stuff out there right now that will not work. That is the problem—how do we ferret that out—and then, number 2, make certain we do not procure anything like that in the future. Those are the two basic problems we are facing, and TQM will not solve that.

I am all for TQM, but that is not going to solve either one of those problems right now.

General **Smith**. Sir, if I could comment on that. I agree, when we began this audit with the DOD IG, our system really relied upon, one, the contractor producing things in accordance to the specification, and of course, the contract administration office overseeing that, but the primary responsibility was for the contractor to produce it to a specification.

When the DOD—as Mr. Vander Schaaf testified, the audit shows that system broke down; it did not work, it did not assure us. Now, I do not agree with the total percentages, because we are still looking at each one of those nonconformances, and I think they are considerably smaller than Derek presented, but it does not make any difference; if it is a difference in some cases between 11 percent and 50 percent, 11 percent of major nonconformances in the gun glass is too doggone many.

So as a result, we in the Air Force are going to have to go to some form of incoming post-receipt inspection, which we have not done, to monitor whether this system is getting better or not.

General Pepe noted that they do that in DLA; I must do it in the Air Force, also, and the two systems will feed together. So I think the answer is that I agree with Derek that we have to have some form of inspection to make sure that the TQM is working at the supplier and the vendor rating system as it comes in.

We have not done that in the past, and I am going to do it in the future; it is just a matter of how many resources I put against it, and that will be a financial decision.

Chairman GLENN. Well, I was right with you up until your last statement—that there is going to be a financial decision here that we are going to make sure that parts will work in combat?

General SMITH. Oh, no, sir. I am going to make sure the parts will work in combat. I am extremely concerned about that. And we do, of course, have the other checks, the QDRs. But I am going to determine how much we can continue to do the kinds of inspections which the DOD IG has done, except I am going to do it on an incoming basis instead of pulling things off the shelf, over a period of time. And the level of that will depend upon what we start finding when we begin doing that inspection.

Chairman GLENN. You see, I guess what bothers me, too, is these particular parts they picked—they were not things you had a lot of trouble with. These were picked at random. That bothers me as much as anything else, because it means if we randomly pick a lot of other stuff out there—if instead of 46 separate items, we pick another 500 items out there, we are probably going to wind up with some of the same percentages. Is there any reason to think that would not be true?

General SMITH. Sir, the number one class that we had a problem on—and as we have sorted through to date, we have found two parts where we have had major nonconformances, then another number, 10 parts, where we verified minor nonconformances. Those numbers are somewhat smaller than what Derek briefed, but this is a case now of having the engineers come down to reality.

Both of those were found in the 1005 class, which is the gun part, and I am going to start with things that meet the pedigree of that 1005 class gun part, and those are relatively simple-appearing geometry, very tight tolerances because of the environment in which they work.

It seems that our largest problem is in that area. So I am not ready to take that and put it over all of the Federal stock classes we measure in the Air Force.

Chairman **Glenn**. Why was the Air Force so hesitant to cooperate with the Inspector General?

General **Smith**. I was disappointed to hear his reaction, or his perception of the hesitancy. If I could give it from my side, sir, of course, we have had the quality deficiency report system for a long time; there was nothing in that to indicate that there had been an adverse trend in quality. There was nothing in my consumption rates that indicated an adverse trend in quality.

They came and asked to inspect 186 different kinds of items and multiple numbers of those, and the work load as they laid it out was going to take us about 45 man-years to do this job. They asked that I do it in-house, in an organization which had 31 people doing other things. And it was the same period of time, as you know, Senator Glenn, because General Hanson has at least talked about it often enough, we were pulling 6,000 people down in our command, and I was 88 percent funded in depot maintenance and less than peacetime operating in spares—so that was another financial demand on me.

And Mr. Vander Schaaf and the IG were approaching it as if they had a major quality problem; I was looking at it and said we have this very large system which seem to have served it well, so perhaps we can do less of it. I was not being reticent about it; I was trying to scope it within my financial resources. And we did then commit $100,000 to do it.

At this time in the study there are a lot of things I would have done differently in dealing with the DOD IG. One, I would have expected more, because I would like to be able to pull more statistical information. I would have done it differently—independent labs—we have had some problem with the independent lab findings, because they did not understand the data, not because they were incapable.

I would have had our engineers more closely involved. But all of those are lessons to learn as I put in this monitoring system over time.

But the fact came that there were too many discrepancies—I certainly do not think of the magnitude that Derek briefed—but there were too many discrepancies. Eleven percent of the stock numbers we look at in the gun class are too many to have bad parts on. So I have got to deal with that.

Chairman **Glenn**. Let me go to the bearings here, because Mr. Vander Schaaf testified that after a number of retaining bearings were found to be unusable, the contractor agreed they were unusable, and they scrapped them from their inventory. Yet the Air Force responded that the bearings were usable. Why did the Air Force approve those bearings, which suffered from major nonconformances, even after the contractor agreed they were defective?

General **Smith**. Senator, the nonconformances were on these were minor nonconformances; they were not major. And the contractor could not present those to us because, as we have noted before, the contractor would be guilty of fraud if he knowingly presented us nonconforming material. He scrapped those bearings because they in fact did not conform.

We used the bearings——

Chairman GLENN. No; they did not meet spec.

General SMITH. They did not meet spec. They were in minor nonconformance.

Chairman GLENN. But the Air Force says it doesn't make any difference if it meets spec or not; we are going to go ahead and use them.

General SMITH. No, sir. When we finished this IG look, and there were 46 items that he said we have problems with, 11 of them with major discrepancies, my first reaction was to freeze the stock on all 11 items so that they would not enter Air Force equipment. I did not want those things in equipment.

The decision we made on those bearings after we went out and inspected each of them is that there was no safety or functional problem with them entering into the system. Then I will go back and sit down with my engineers to look and see if I need to change specification.

Chairman GLENN. Then that is the next question. Were they over-speced to begin with?

General SMITH. In the case of the bearings, that I do not know—we do not really think it is over-speced. Let me give you the one with which I am familiar.

Chairman GLENN. They do not meet spec, but you say they are usable. That does not fit together very well.

General SMITH. Well, let me give you the one that I have a great deal of knowledge about, because I agonized with it, and that is the shaft, which was the other major nonconformance, which is the gun part.

In that particular case, if we can install it, it is all right; but if you have a tolerance build-up, you could not install it, and then it is unusable. But the engineers did not want to change that specification for good reasons, because it made that tolerance build up to where it was too close to the margin and would make some of them unusable.

So could I use those shafts? Yes, if I could install it in the retainer, I could use it. If the tolerances had built up on the other items, they could not.

And in the bearings, the only thing that I can think of is that there might be a slightly less than desired life-expectancy. We used those because they were serviceable as they were, and we needed it to continue to support the Air Force. The contractor could not present them to me because I would not change the specification, and he would not knowingly give me defective items, or that would be fraud.

Chairman GLENN. Carl.

Senator LEVIN. Thank you, Mr. Chairman.

I understand that the Chairman has asked the question about the lack of a warranty for parts that we have accepted, and that the answer was that that has been changed since July of 1988, when we have a new simplified warranty. Is that correct?

General SMITH. Yes, sir. In the contracts at least in our command, we tested at one of our Air Logistics Centers for about 15 months where we used on all competitive contracts this simplified warranty, which very simply states if in one year we find parts that do not conform, you have to replace them or refund the money. We extended that to all of the contracts we placed competitively within our command in July 1988.

Senator Levin. Okay. But I think it is important that the answer to the Chairman's question is that this applies only to competitive contracts, not to sole source contracts; is that correct?

General Smith. Yes, sir.

[Information subsequently submitted follows:]

Since July 1988 we have been putting a one year simplified warranty clause in all competitive contracts. This clause, in the AFLC FAR Supplement, will be amended to extend its use to two (2) years, and to include sole source contracts. Policy on extended warranty will be issued in May 1989.

Senator Levin. So that we still have a problem, because as I understand it, the largest percentage of dollars that are spent—not the largest number of contracts but the largest number of dollars that are spent—are still spend on sole source contracts; is that true?

General Smith. Yes, sir.

Senator Levin. Do you know, for instance, of the 46 items that you made reference to that the Inspector General looked at, how many of those 46 items were purchased by sole source and how many were competitively purchased? Offhand, do you know?

General Smith. No, sir, but I could furnish that for the record; we do have that data.

Senator Levin. Yes, why don't you let us know that.

[Information subsequently submitted follows:]

Total items	Competitive	Sole source	Total
Major nonconforming	4	[1] 4	8
Minor nonconforming	12	19	31
Conforming	2	5	7
Total			46
USAF reclassified:			
Major nonconforming	2	0	2
Minor nonconforming	12	21	33
Conforming	3	8	11
Total			46

[1] Two contracts, counted as one item to avoid double booking.

Senator Levin. Now let's talk about the contracts which are purchased sole source, which again represents the majority of the dollars that we spend. What are we going to do in that situation? We have either got to change our inspection system, it seems to me, before we accept the product or we have got to get a warrant on those as well. It is one or the other, because we cannot continue with this kind of a situation which the Chairman has identified, where we have such a large percentage of items that do not meet specifications.

Which is the better alternative?

General Smith. Sir, if I could explain a little the rationale of why we ended up putting that on the competitive contracts, we have a law, of course, that we consider warranties on all acquisitions, and that we do, and there is a cost benefit analysis that we are required to go through as we go through the warranty, and most of that applies in the negotiated time frame. The reason that we wanted to put the simplified warranty, unless there was a more detailed warranty called for in the competitive contract, is that made it to where, when we do the 85,000 actions—of which about 90 percent in our command are competitive—a very simple decision, at a basis, at a very minimum we should have this.

I would hope on the sole source negotiated kinds of contracts that we would consider even more sophisticated warranties than a simple workmanship of materials warranty for a period of one year.

Senator LEVIN. But we don't. We don't have a warranty, as I understand it, that survives beyond acceptance in these sole source situations.

General SMITH. If we have a warranty, it survives acceptance, sir—if we do. In my command, I do not think we have one that is mandated on every contract like I did on competitive contracts.

Senator LEVIN. The question is how are we going to address the question in the noncompetitive situation that is created when we accept parts, because that they wipes out the manufacturer's responsibility in the absence of fraud. How are we going to address this problem? We have either got to have a warranty in there which survives acceptance, or we have got to have inspection that we can rely on.

General SMITH. Yes, sir, one of the two.

Senator LEVIN. It is one or the other, as far as I can see. There may be other alternatives, but I do not see them very rapidly. But I do not think the status quo is acceptable, given the data which has been displayed and discussed here.

What are you going to recommend for the noncompetitive situation?

General SMITH. Well, General Pepe and the others were talking, the Contract Administration Offices are changing the number and kinds of things they look at also, and of course, we can change and look and see if we could put a workmanship of materiel warranty—a deferral of finality of acceptance is really what that is for 12 months.

Senator LEVIN. Yes, I do not see how that would create a big cost, frankly, for the manufacturer. Where the manufacturer has in place an inspection system, I do not see where a warranty of the kind you have in competitive contracts, continuing beyond acceptance in a negotiated situation, is creating a particularly big insurance expense for the manufacturer. It shouldn't, because they are inspected. And if it does, there is something wrong with the inspection.

So I would hope you would look at that and get back to us on that very precise, narrow point.

General SMITH. I certainly shall, sir. I had the contracting job when we put the other one in, and my answer to that the cost would increase was that I would like to talk to the company executive who increased cost for producing items which conformed.

Senator LEVIN. Just one more question, Mr. Chairman, if I can have an additional minute, and that is on the question of fraud. Where there is fraud, a knowing failure to inspect or a knowingly inadequate inspection, that is an answer to the argument that we have accepted the product—I mean, the fact that we have accepted a product is not usable by a manufacturer where the manufacturer committed fraud.

My question of Mr. Vander Schaaf—and I think you probably heard it—was if the manufacturer has a grossly negligent inspection, or where the manufacturer should have known—not that the manufacturer did know, but the manufacturer should have known—that the part was defective with a reasonable inspection system, does that constitute fraud within the meaning of our contracts or of statute or of case law—do you know?

[No response.]

Senator LEVIN. Okay.

I think Mr. Vander Schaaf's answers for the record will presumably answer that question. Will you consult with him on that question and see if your people have anything they can add to that answer?

General SMITH. Yes.

Senator LEVIN. There should be less of a need for that answer if we are going to put warranties in here. If we are going to have warranties which survive acceptance—I am using probably not terms of art here, but I think you understand what I am referring to—if acceptance of these products by us does not terminate the manufacturer's responsibility, even where there is no fraud, if we are going to have these kinds of simplified warranties which you have now put into effect on your competitive contracts since last July, the narrow issue about what fraud means and whether it includes gross negligence should not be quite as important, but still it could have some importance. So your consultation of your people and the IG would be helpful, and his answer to those questions for the record.

Thank you, Mr. Chairman.

Chairman GLENN. Thank you.

I just have one last thing, and I want to come back to Mr. Katzen. In your statement on page 2 at the bottom you say, "I am encouraged by the fact that the IG has identified no safety or critical issues." Now, that just is not correct. And you say, "Most parts with a few exceptions were fully usable"—also not correct—"therefore, wholesale changes are not justified"—and the next sentence—"corrective action has already been taken to preclude recurrence of those nonconformances validated."

What specifically has been done? Now, TQM, I am all for, I repeat that, and it is going to come in over a period of time; it is a change in mind-set and work attitudes and things like that. But what corrective action has already been taken to preclude recurrence of those nonconformances?

Mr. KATZEN. General Smith is going to answer that.

General SMITH. Sir, if I could speak to the question of no safety-critical—there were no safety-critical items in this.

Chairman GLENN. It says "no safety or critical items"—it is critical to me if they will not work in combat.

General SMITH. Yes, sir. There were two that had major defects. When the IG finished their survey, they said, "We feel that there are 11 different part numbers" such as the part which Derek held up, that these have major nonconformances.

After we have gone through all of the engineering analyses, we are ready to agree, the engineers now have classified two of the nonconformances, two of those parts, as major nonconformances, and another five, then, as minor nonconformances, or probably eight, because there are still some left out, some that we are still doing the analysis. Those two did not create any kind of safety or critical things. One was that partition retainer. That was identified by a quality deficiency report, and it cannot be installed in its current configuration. The nonconformance made it where you could not put the part into the drum.

So those are not going to get into an aircraft because they cannot get into an aircraft—they just do not fit. That is how bad the nonconformance was, and we agree to that.

Chairman GLENN. But if you have a broken part, then it means the airplane is down.

General SMITH. Yes, sir.

Chairman GLENN. It cannot perform its mission.

General SMITH. We would have not had a part, because that part would not work. But its installation would not be safety-critical—safety-critical in application.

Chairman GLENN. Then it says "no safety or critical"—I took those to be two different things. "Critical" means can it perform its combat role or not. If it can't, that is "critical" to me.

General SMITH. Yes, sir. It was a critical defect in that you could not even install it, so a drum could not work with that in it because it couldn't even get in it. To that extent, yes, sir, it is critical.

Chairman GLENN. So we have reduced our combat capability by one aircraft if you don't have that part?

General SMITH. We could have, sir, yes, sir.

Chairman GLENN. How about the other—"corrective action has already been taken to preclude recurrence of those nonconformances validated"?

General SMITH. We have taken all 46 defective parts—not just the 11 majors—we took all 46 items; we have written quality discrepancy reports, then quality discrepancy investigation reports, which have been out to the contractors and the contracting activities. In some cases, the contractors have replaced the items with conforming items—by the way, including that partition retainer. We had two contractors on that. One produced conforming items, the other did not. The one that did not produce conforming items is now in the process of replacing all their partition retainers.

We have changed the processes that were occurring in the contractors' facilities that allowed those nonconforming parts to be fixed—and General Pepe could address that more because that is a standard operation within the Contract Administration.

So we have dealt with each of those discrepancies. Now, we have still not in my mind dealt with a system that allowed—I will use my percentage of 11 percent—11 percent of the items in that stock class to be defective. We have not fixed that yet, and that is what we have to work with as a community.

Chairman **Glenn**. Well, the ones we have corrected are the ones we have found on a very limited sample so far, and we have thousands of these things out there, and we have only tested 46. I am just wondering what is going to happen now when we go out there and test more of these things, while we wait for TQM to get into place—and I fully back that, as I have said 10 times already this morning, and want to provide you whatever resources you need to do that. But that is a long-term thing. If we went to war tomorrow, God forbid—which it does not look like we are going to do right now—but if we did, and we started using these spares that just a sampling has shown are not up to spec and would not work, you gentlemen have a big job over there. So I do not agree with your statement that we have precluded all these things in the future, "will review carefully the evaluation criteria used by DOD IG versus contractor criteria to verify statistical validity of sample items, extrapolation of sample results in the population as a whole." That means on these thousands of items, it seems to me, if that is a true statement, and you really mean to do it, you have a big testing program to go through, taking stuff and seeing if it meets spec. Is that what you plan to do?

General **Pepe**. Sir, we are increasing our testing program, absolutely.

Chairman **Glenn**. Do you plan to go through all these other thousands of things that are combat-critical, starting with items actually on aircraft or tanks or whatever it is that would be actually in combat—machine guns, whatever—are you planning those right now on combat-critical and then work back to others?

General **Pepe**. We are working all safety-items and then a random and selective sampling of items in our depot system, yes, sir. We are also changing the process——

Chairman **Glenn**. Now, "safety" or "critical"?

General **Pepe**. "Safety-critical."

Chairman **Glenn**. If you mean, do they blow up and endanger the man using them—no—are they going to perform in combat, that is critical to me, too.

General **Pepe**. Yes, sir, and it is critical to us, also. We are very, very sensitive to it. The wherewithal is just not there to tackle those thousands and thousands of items overnight.

What we are doing is moving into a program deliberately, if you will, starting with safety first that is going to kill somebody in peacetime, and then to those items also that cause an inferior product and would impact our combat readiness.

Chairman **Glenn**. Well, I would think, too, that we must have a better way over there of taking care of this where we feel a contractor is not living up to the contract responsibilities. We may need far more than a one-year warranty—the stuff will sit on the shelf longer than 1 year before it is used, so you have to have more than that. And if you have some bad performers out there—which we obviously do have—you have to preclude them from getting into the business. Let them go off and sell their machine gun links or their parts to somebody else, but not us. I would think that once is their fault, twice is our fault if we let them back in the door again. It would seem to me that that would be a good rule to follow. Maybe it would be helpful to hear from industry at several different levels, major primes, system integrators and subcontractors and other industry segments. We might want to get some information on their position on some of these warranties and things and maybe supplement our record with some information like that in the future, too.

So gentlemen, we thank you very much for being here this morning.

There may be questions from some other members of the Committee.

We all have a lot of work to do. We were rather critical this morning, obviously, but that is only to try and get at the problems here. I assure you my cooperation in trying to work out whatever modalities are necessary to make sure we correct the situation as the IG found it, and I think we need to do a lot more of that type of testing so we can see how far this goes.

If this sampling of 46 in the 6,000 tests run pursuant to that in checking those 46 parts, if this is indicative of what we are going to find in other areas, then that is something that is a national disgrace. If that is the situation, we had better know it now, not when we get into combat—that is the main point, as we have pointed out several times this morning.

Thank you very much. We appreciate your being here.

The hearing will stand in recess subject to the call of the Chair.

[Whereupon, at 12:35 p.m., the Committee was adjourned.]

APPENDIX

STATEMENT BY

DEREK J. VANDER SCHAAF, DEPUTY INSPECTOR GENERAL

DEPARTMENT OF DEFENSE

BEFORE THE

COMMITTEE ON GOVERNMENTAL AFFAIRS

U.S. SENATE

ON

NONCONFORMING PRODUCTS IN THE DEFENSE SUPPLY SYSTEM AT WARNER ROBINS AIR LOGISTICS CENTER

Mr. Chairman and Members of the Committee:

I am particularly pleased to be here today to contribute to your review of an important issue -- that of nonconforming products in the Defense Supply System. Nonconforming products are spare parts that do not conform to the contract requirements for manufacturing the part. Nonconformances can vary in type, such as oversized dimensions in screw holes that may not affect the use of a part, or use of improper materials that may cause a part to break during installation or use because of structural weaknesses. With an estimated $88 billion of spare parts currently in the DoD inventory, I believe your concerns are well placed. I welcome the Committee's interest in improving the quality of DoD spare parts. We conducted an audit to review spare parts for conformance to specifications at Warner Robins Air Logistics Center in Georgia, and I have a copy of the audit report with me today.

The issues addressed in the report relate to poor quality control at contractors' plants and inadequate DoD actions on quality. Our Military Service members depend on quality equipment to carry out their mission, and our national security depends on quality products. If, for example, some of the 20-millimeter gun parts we identified were in an A-7D aircraft when a pilot attacks a fortified position, those guns may not work. Based on the poor quality of some of the parts on the shelves in the Air Force warehouses, there is likelihood that the guns would fail or jam.

AUDIT COVERAGE

During our audit, the auditors selected four samples of spare parts from the inventory at Warner Robins Air Logistics Center. Those parts had previously passed through all of the approved internal quality controls and Air Force screening checks built into the procurement process. Therefore, no unidentified nonconforming parts should have reached the warehouses. The parts were supposed to be of good quality for the war reserve stock and regular inventory. All parts we reviewed were manufactured to DoD specifications and accepted at the contractor's plant. To determine if the parts met the specifications, the auditors sent the parts to independent laboratories. We did not test for nonessential characteristics, such as paint color or surface flaws. The laboratories tested the parts in accordance with Air Force engineer-approved test plans to determine if the parts met critical or essential specifications. Where the laboratories found major problems with the parts, we had the parts retested at another laboratory or by the contractor to verify the results. We visited the contractors plants to find out the cause of the problems. We then provided the results of the tests to the Air Logistics Center for its followup actions.

Action on the part of Air Force Officials during the conduct of the audit reflected less than full commitment to the problems of identification and correction of nonconforming products. The Air Force lack of cooperation added 12 months to the length of the audit and limited the scope of the audit to only a few Federal supply classes at only one, rather than three, Air Logistics Centers as originally planned. During the first year of the audit, the Air Force refused to provide support for testing, which forced us to request assistance from the Defense Logistics Agency and its network of commercial independent laboratories. After finally reaching an agreement for limited support, the Air Force delayed the audit further by refusing to release items for testing. In addition, the audit was further delayed from May through October 1988 when the Air Force did not initiate Quality Deficiency Reports on the parts that the independent laboratories identified as nonconforming. By delaying initiation of the Quality Deficiency Reports until October 1988, the investigations of contractors could not be completed in a timely manner for inclusion in the final audit report. The Air Force had requested that the results of the Quality Deficiency Reports be included in the final report. The last response we received from the Air Force for inclusion in the final report showed that 16 of 45 Quality Deficiency Reports were incomplete. Consequently, the Defense Logistics Agency and the Air Force based part of their comments to our draft report on incomplete and inaccurate Quality Deficiency Reports.

DEFINITION OF TERMS

Before I describe our audit results, I would like to explain the terms that DoD uses to describe the three degrees to which spare parts do not conform to specifications. The first term, a minor nonconformance, is similar to buying a new tire and the white sidewall is scarred. The tire will still last the 40,000 miles, as rated, but you would expect the sales person to reduce the price. Also, a tire with minor nonconformances should be identified at the contractor's plant before shipment, and the contractor should initiate corrective actions to the manufacturing process to ensure no other tire sidewalls are scarred during the manufacturing process.

The next degree is called a major nonconformance. A major nonconformance is a deviation from specifications to the extent that the parts can adversely affect safety, health, reliability, durability, performance, or interchangeability. Getting back to the tire example, a major nonconformance is like buying a tire and finding that the tread is thinner on part of the tire. You can use the tire, but it will not last 40,000 miles as specified. The contractor should have identified the thinner tread before the tire was shipped and should either discard or rework it to specifications. Spare parts in the Defense inventory with major nonconformances can be usable, however, the parts will not last as long as they are designed to last.

The last and most serious degree of nonconformance is called defective. Those are parts with major nonconformances to the extent that the parts are not usable. Getting back to the example, a defective tire is one where the sidewall is cut through. You just would not drive on it because it may blow out.

EXTENT OF NONCONFORMANCES

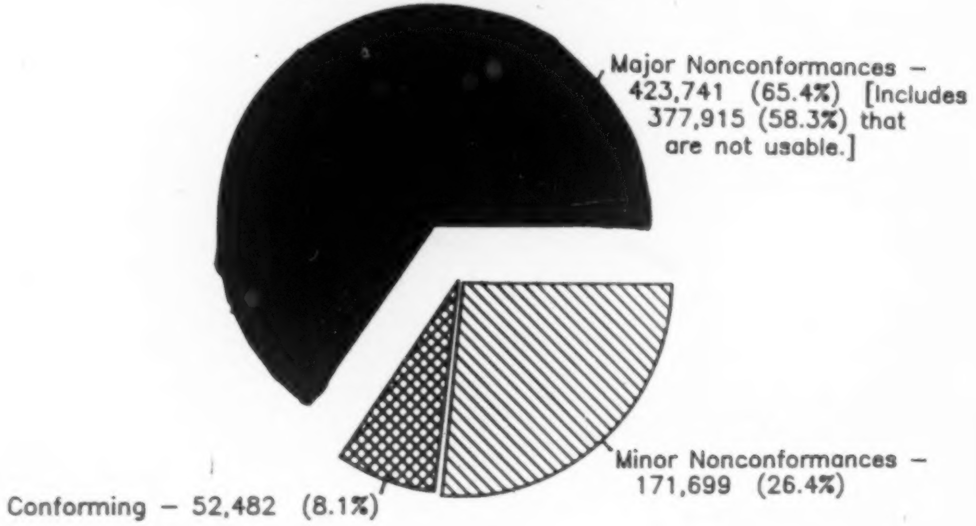
I would like to now refer you to the charts attached to my statement and discuss the audit results.

- The first and second charts show gun part testing results projected by number of parts and dollar value. These gun parts are primarily used in 20 millimeter and 30 millimeter guns that are mounted on aircraft such as the A-7D, F-4E, F-5A, F-15, and F-16. The gun parts perform functions such as feeding ammunition to the gun. Nonconforming gun parts can cause an unexpected or premature gun stoppage.

  Chart 1 shows that 65 percent of the gun parts had major nonconformances, 58 percent of the parts were not usable, and only 8 percent of the parts conformed to specifications. The second chart projects the results by the dollar value of gun parts. The major nonconformances were 13 percent of the total value of $110 million and 11.6 percent of the gun parts were not usable. The large difference in percentages between the two charts for major nonconformances is because there were large numbers of gun parts with small unit prices with major nonconformances. Conversely, there were fewer parts with high unit prices that had major nonconformances.

STATISTICAL PROJECTIONS OF THE RESULTS FROM TESTING GUN PARTS THROUGH 30 MILLIMETERS

By Number of Parts

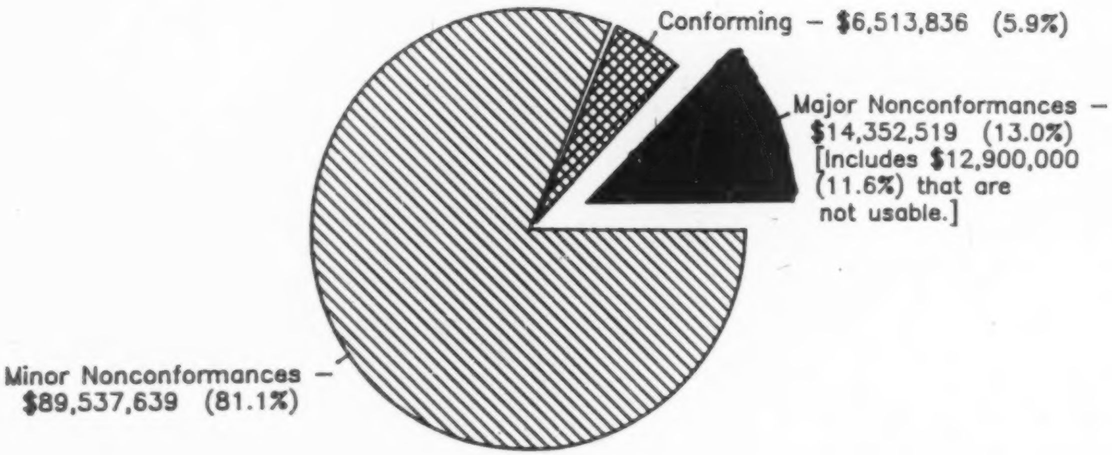


NUMBER OF PARTS IN UNIVERSE
647,922

CHART 1

STATISTICAL PROJECTIONS OF THE RESULTS FROM TESTING GUN PARTS THROUGH 30 MILLIMETERS

By Dollar Value



TOTAL VALUE OF PARTS IN UNIVERSE
$110,403,994

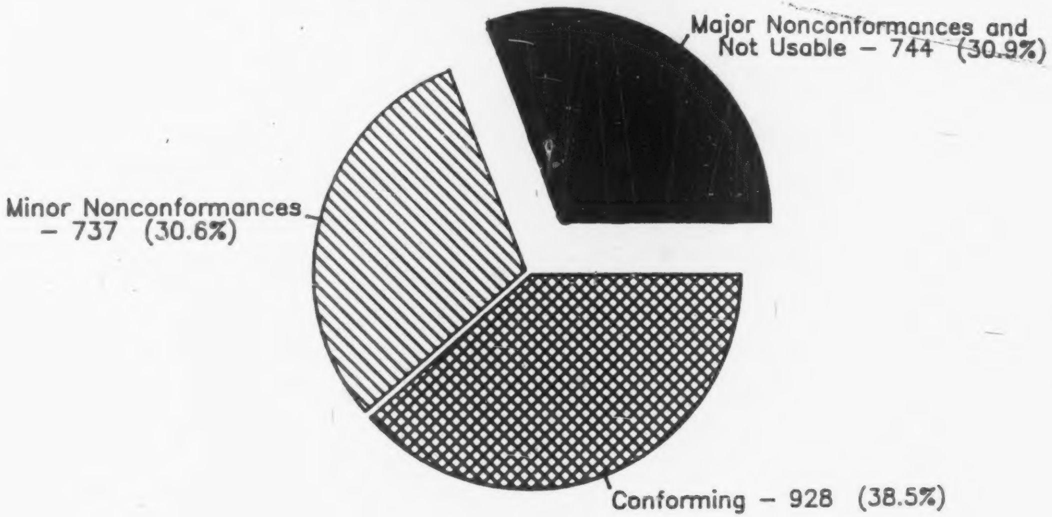
CHART 2

- The third and fourth charts show the results of testing mounted bearings. These mounted bearings are used on a variety of aircraft for a variety of functions. The function of the mounted bearing is often critical to the overall function of the plane and the bearings are used as part of the landing gears for tactical fighters, main rotor heads on helicopters, or on the wing flaps of cargo planes.

The third chart shows that about 31 percent of the parts had major nonconformances and were not usable, and the fourth chart shows that about 34 percent of the dollar value of parts had major nonconformances and were not usable.

STATISTICAL PROJECTIONS OF THE RESULTS FROM TESTING MOUNTED BEARINGS

By Number of Parts

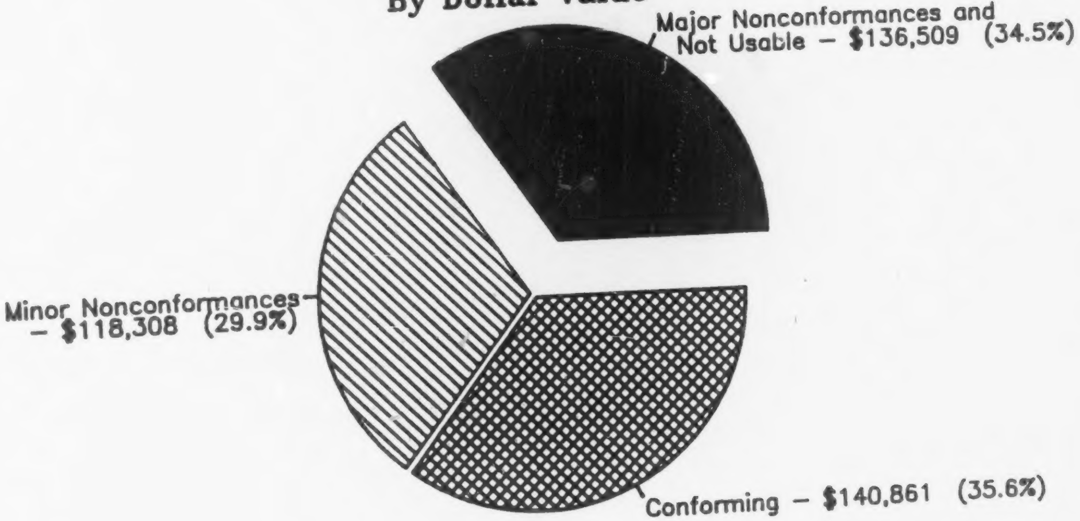


NUMBER OF PARTS IN UNIVERSE
2,409

CHART 3

STATISTICAL PROJECTIONS OF THE RESULTS FROM TESTING MOUNTED BEARINGS

By Dollar Value



TOTAL VALUE OF PARTS IN UNIVERSE
$395,678

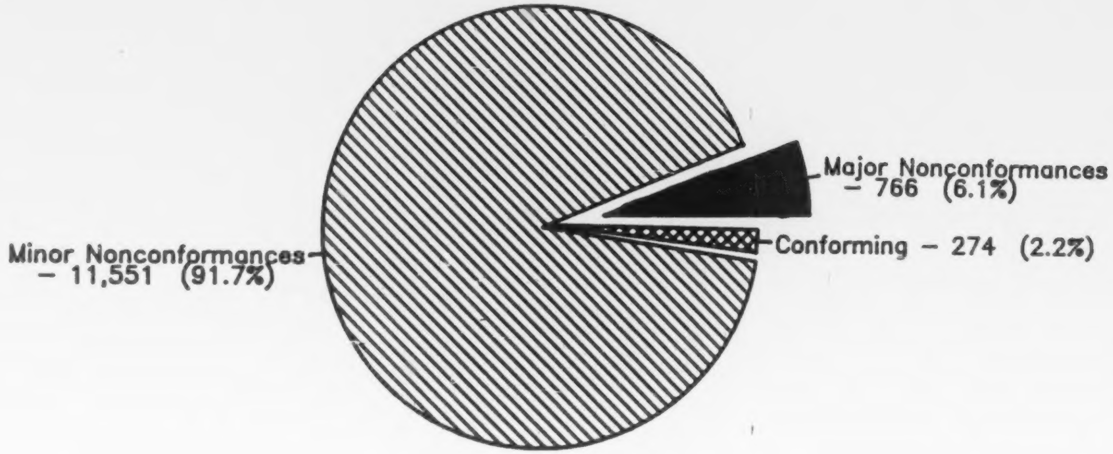
CHART 4

- The fifth and sixth charts show the results of testing fastener hardware. The fasteners tested were specialized bolts, screws, studs, washers and pins that were used for specific purposes on a variety of aircraft. For example, one bolt costing about $20 was used in the multiple disc coupling assembly on the tail drive shaft of the HH-3 helicopter.

About 6 percent of the parts had major nonconformance and 92 percent had minor nonconformances. The results projected by dollar value show that about 44 percent of the dollar value of the fasteners were major nonconformances. The large difference in percentages for major nonconformances between the number of parts and the value of parts was because some bolts costing over $20 each contained major nonconformances while the other fastener parts cost $2 and under.

STATISTICAL PROJECTIONS OF THE RESULTS FROM TESTING FASTENER HARDWARE

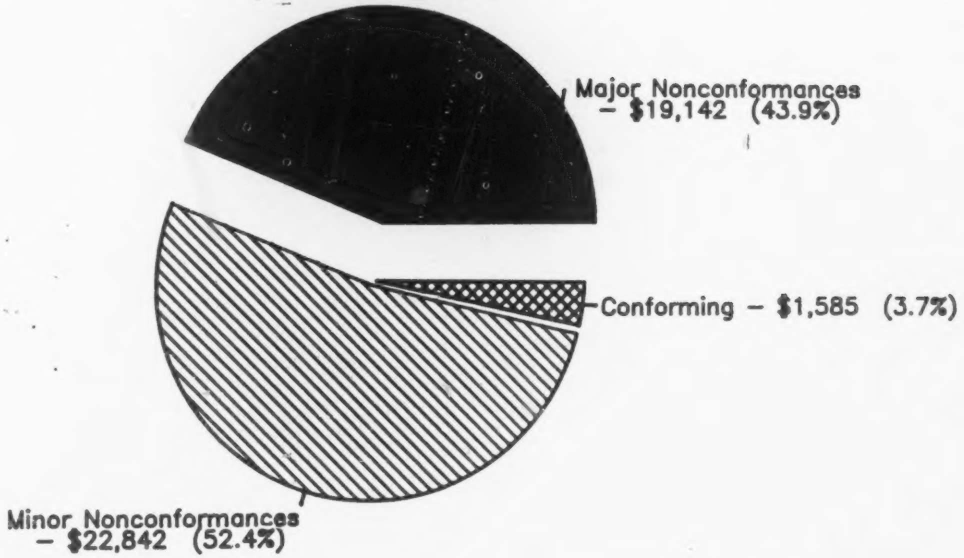
By Number of Parts



NUMBER OF PARTS IN UNIVERSE
12,591

CHART 5

STATISTICAL PROJECTIONS OF
THE RESULTS FROM TESTING
FASTENER HARDWARE
By Dollar Value



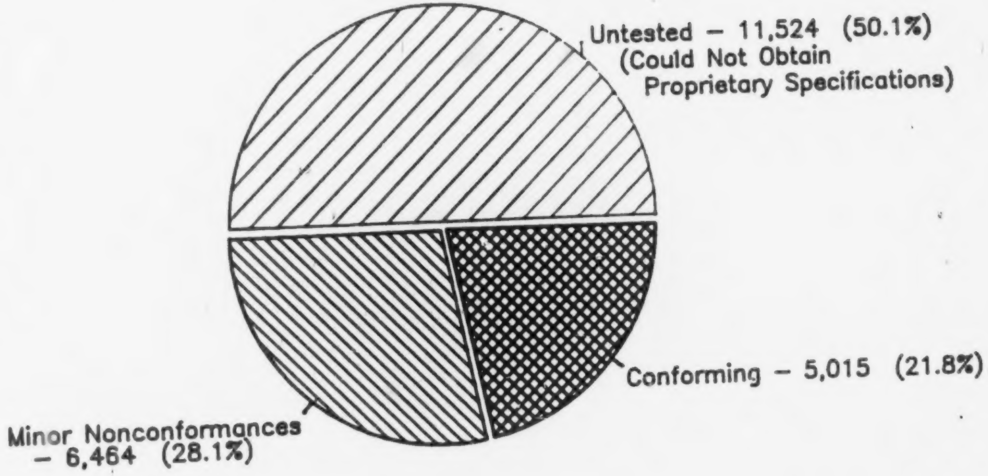
TOTAL VALUE OF PARTS IN UNIVERSE
$43,569

CHART 6

- The seventh and eighth charts cover the results of testing hand tools used for specialized applications for the maintenance of weapon systems. For example, one tool was a wrench used on a specific hex nut in the F-100 engine. The tool has a specialized configuration so it can reach the hex nut.

We found no major nonconformances in that universe of parts, but about 28 percent of the tools had minor nonconformances. The section of the charts showing untested refers to certain tools for which we were unable to obtain the proprietary specifications from the contractor for detailed laboratory testing. We did subject those parts untested by laboratories to functional tests and determined that the tools could be used.

STATISTICAL PROJECTIONS OF
THE RESULTS FROM TESTING
HAND TOOLS
By Number of Parts

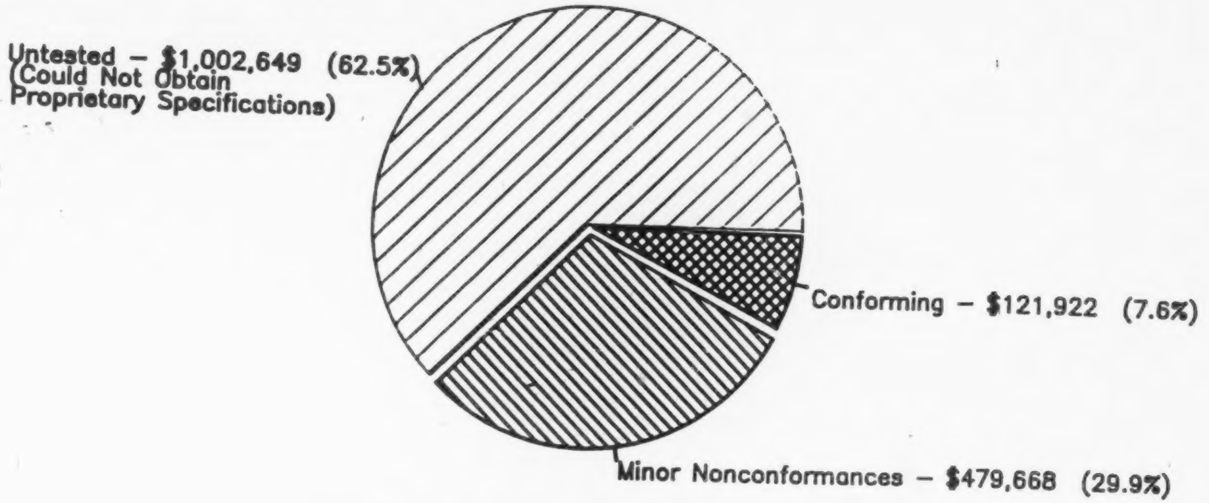


NUMBER OF PARTS IN UNIVERSE
23,003

CHART 7

STATISTICAL PROJECTIONS OF THE RESULTS FROM TESTING HAND TOOLS

By Dollar Value



TOTAL VALUE OF PARTS IN UNIVERSE
$1,604,239

CHART 8

The audit report presents details on those items, but I think the charts illustrate the significance of the problem.

It is easy to recognize the impact of the parts that were not usable or had major nonconformances. On the other hand, minor nonconformances are more subtle. However, a good contractor should have identified any nonconformance before the parts left the factory. Once identified, the contractor should present it to the Government Quality Assurance Representative. If the Department wants to accept the parts, some consideration should be provided by the contractor, such as a price reduction. Our audit showed that contractors did not identify the nonconformances, and, as such, needed changes were not made in the manufacturing processes. The Air Force received no price reductions or other type of consideration from any contractors for accepting the $90 million of parts we identified as having minor nonconformances.

THE DOD QUALITY ASSURANCE SYSTEM

The DoD Quality Assurance System is an integrity based system that is dependent on the contractor's ability to produce and deliver quality products. The Federal Acquisition Regulation requirements on quality, cited for all spare parts contracts, provides that the contractor is responsible for controlling the quality of parts and for providing the Government only those parts that conform to contract requirements. That means DoD relies on the contractor's quality control system. A portion of the price the Department pays when it buys parts is for contractor quality inspections and quality tests on parts produced. The audit concluded that the DoD Quality Assurance System simply is not working as intended, and that the Air Force did not receive the quality parts they paid contractors to produce.

Department of Defense contracts usually cite one of three levels of quality requirements. The basic level is the standard inspection requirements described in Part 46 of the Federal Acquisition Regulation. The Department usually employs higher level quality requirements that go considerably beyond the standard inspection requirements. The second level of quality requirement is Military Inspection 45208A, which requires contractors to have an inspection system approved by the Government. The third level is Military Quality 9858A, which emphasizes contractor quality management along with quality controls for purchasing and manufacturing. The nonconforming gun parts we sampled were all supposed to be manufactured to the requirements of Military Inspection 45208A. Our results indicated that, although higher level quality requirements were cited for the parts we sampled, DoD does not appear to receive greater quality than when the standard inspection requirement is cited.

The DoD uses a multilevel quality assurance system in an attempt to discover nonconforming parts before the parts enter the Defense Supply System. The Defense Logistics Agency coordinates quality assurance through its Defense Contract Administration Services (DCAS). The DCAS Quality Assurance Representatives are located in manufacturing facilities of large DoD contractors or they visit numerous smaller contractors in a particular geographic region. The DCAS provides quality assurance support for Defense Logistics Agency contracts and the majority of contracts for the Military Services. In some cases, the Military Services have quality control representatives located at some large DoD contractors. The Quality Assurance Representatives verify that final inspection of spare parts are performed by the contractor before DoD accepts them.

Government Quality Assurance Representatives do not normally perform the final inspection of the parts. Instead, the Quality Assurance Representatives merely inspect the paperwork associated with the parts. That occurs because inspecting a part once it is completed and packaged is difficult, if not almost impossible. The Quality Assurance Representatives must rely on the contractor's quality control system and review the paperwork with the part to verify that the contractor certified that all the needed quality checks were performed during the manufacturing process.

CONTRACTOR QUALITY CONTROL

Fifteen contractors that were associated with 32 contracts were visited during the audit to see how their quality control systems worked. There were 17 subcontractors involved with the 32 contracts. We found that 13 of 17 subcontractors provided nonconforming material that was not detected until our audit was conducted. During visits to two prime contractors, we found that the contractors did not use adequate test fixtures to determine whether their subcontractors had provided nonconforming retainer partition parts. Also, neither contractor performed scheduled quality control inspections of their subcontractors quality controls, as required by the contract, to ensure the parts conformed to contract specifications. The retainer partitions are part of the ammunition handling system that controls the positioning of the rounds between the drum cover and the scoop disc in the 20-millimeter gun assembly on the A-7D, F-4E, and F-16 aircraft. Test results showed that those parts will not hold ammunition in the drum and the gun system will not work using these parts.

We also found that 11 contractors did not have adequate inspection practices for manufacturing quality control on 16 of 32 contracts. For example, the quality control practices employed at one contractor's facility failed to detect dimensional nonconformances that occurred in the manufacture of retaining bearings used on the auxiliary power generator of the F-15 aircraft. That occurred because quality control personnel did not perform in-process inspections of machine operators work, did not have control of the cutting tools, and did not employ a manufacturing process control system.

We also found that 5 contractors used inadequate test equipment and fixtures to measure in-process and completed parts for 6 of the 32 contracts reviewed. An example of inadequate test fixtures occurred on the retainer partitions previously mentioned. Neither of the two contractors that produced the retainer partitions used adequate test fixtures to verify that the parts conformed to dimensional specifications.

Three contractors visited did not have an independent quality control function. At two of the contractors, the presidents of the companies were also the directors of the quality control functions. At the third contractor, the vice president was also the quality control representative. Separation and independence of top management and production departments from quality control responsibilities is needed to ensure that production quotas or company profits do not override the need to produce quality products.

I want to add that most of the 15 contractors visited during our review were very supportive. When a problem was identified, they acted to correct the problem. The difficulty with that approach is that the contractor's quality control should be identifying the problems, not the auditors. As an example of cooperation, when we identified surface roughness in the "O" ring portions of a retaining bearing used on on F-15 aircraft, the contractor agreed to rework or replace all nonconforming parts. The contractor also scrapped 42 of the bearings, valued at $9,000, from his on-hand stock that were identified as not usable. Ironically, the Air Force reported in its most recent reply to us that the bearings were usable and did not need to be reworked.

MATERIAL REVIEW BOARDS

The audit showed that repetitive minor nonconformances, when identified, were reviewed by contractor Materiel Review Boards. However, the Material Review Boards did not produce corrective action plans to ensure that the nonconformances did not recur. For example, our audit disclosed an apparent "safety critical" nonconformance on a landing gear bearing for the F-15 fighter aircraft. We later determined that the nonconformance was not critical to safety although the dimensions of the bearing were considerably out of tolerance with the specifications. We learned that the contract specifications were considerably more restrictive than necessary. The problem was pointed out to the contractor, and he executed an engineering change order affecting all future orders for the bearing. An engineering change, executed at any time during the preceding 33 months when 11 Material Review Boards examined the same nonconformance, would have significantly lowered costs for that bearing while maintaining adequate quality.

QUALITY REPORTING SYSTEM

I would like to next discuss the quality reporting system. Part of the audit was to determine whether contracting officers and other acquisition officials were aware of a contractor's historical problems in producing quality parts. Contracting officers use two systems, the Quality Deficiency Reporting System and the Contractor Responsibility Review Program System, to determine the history of a contractor's prior quality problems. We believe both systems provide limited information to the contracting officers.

The Quality Deficiency Reporting System provides reports on a contractor's prior quality problems, provides for cross-reporting of nonconforming parts between the Military Services and the Defense Logistics Agency, and provides necessary corrective actions throughout the acquisition process.

We believe that the Quality Deficiency Reporting System does not provide timely and adequate information to acquisition officials on the quality of spare parts. Historically, the Military Services have had problems getting field activities to prepare Quality Deficiency Reports. In addition, there is usually a built-in time lag of over one year from the time a part is delivered until a report is initiated because it often takes a year or more before the first parts are issued from inventory.

Only 3 of the 39 nonconforming parts in our sample were reported through the Air Force Quality Deficiency Reporting System. The retainer partition was not reported until 17 months after the part was accepted, and an investigation was initiated only after the Air Force decided to respond to our audit results. A Quality Deficiency Report on a scoop shaft assembly for the M61 gun was initiated 14 months after the part was accepted. Also, a Quality Deficiency Report on an Aft Structure Assembly for the GPU 5/A gun was submitted 13 months after the part was received from the contractor. An investigation was closed after that $8,439 assembly with the defect was reported as lost. However, the Air Force did not examine any other Aft Structure Assemblies to see if there was a common problem. None of those three Quality Deficiency reports resulted in the identification of problems at contractor plants or the elimination of the bad parts from the inventory.

Another problem with the Quality Deficiency Reporting System is that it will normally only identify spare parts that cannot be initially installed or used because the parts do not pass form, fit, or function tests during installation. Also, a spare part that breaks immediately after installation may be identified in a Quality Deficiency Report.

Spare parts that fail to meet their engineering life expectancy are unlikely to be identified in a Quality Deficiency Report. For example, parts in our sample with major nonconformances failed hardness, strength and dimensional tests, and engineers' analyses stated that the parts will fail prematurely or will lack durability. That could result in gun parts that may have been designed to last for 100,000 rounds of fire, but fail after 25,000 to 50,000. A maintenance technician may not have any idea how many rounds were fired before a part is replaced. Thus, the technician would not complete a Quality Deficiency Report, and systems engineers or contracting officers are not made aware of a quality problem.

We believe that the shortcomings identified in the Quality Deficiency Reporting System are serious. In the fall of 1987, I testified at a hearing on product substitution before the Permanent Subcommittee on Investigations, Committee on Governmental Affairs. During the hearing a member of the Department said that the Quality Deficiency Reporting System is the "cornerstone" of the Defense product feedback system. That system is one of the four ways used to identify and prevent product substitution from endangering the lives of our military personnel. Based on what we have since learned about Quality

Deficiency Reports, we believe the Department has a significant problem. Contractors engaged in product substitution may be receiving additional contracts because the Quality Deficiency Reporting System either does not identify them or identifies them only a year or more after the parts are delivered.

CONTRACTOR RESPONSIBILITY REVIEW PROGRAM

The results of Quality Deficiency Report investigations should be included in the Air Force Contractor Responsibility Review Program System for examination by contracting officers. We found that the system does not contain adequate historical information on contractor quality problems. The system is supposed to collect data primarily from contract administration offices and Quality Deficiency Reports that reflect contractors' poor quality performances. We found that none of the Quality Deficiency Reports previously discussed were available in the Contractor Responsibility Review Program System for examination by contracting officers. Without information about a contractor's prior quality history, the contracting officer may make the award of a contract based primarily on price. That can result in contractors with sloppy manufacturing and poor quality controls to continue to win contract awards while the Department continues to receive nonconforming parts.

For example, in May 1986, a Quality Deficiency Report was initiated on a conveyor element for the 30-millimeter gun. A subsequent investigation showed that the Air Force bought thousands of conveyor elements at a cost of about $1.5 million that were not usable. The poor quality of the part was previously reported in 1983 on a Quality Deficiency Report. The contractor refused to replace the parts because Government acceptance of the parts was considered final. After the Air Force was denied corrective action by the contractor, the Air Force determined that no further action could be taken. The Quality Deficiency Report was closed with no report of poor quality workmanship recorded against the contractor in the Contractor Responsibility Review Program System.

Within months of having to scrap conveyor element parts worth $1.5 million, the Air Force awarded that same contractor a contract to supply a complex safety critical part for the F-16 aircraft. Warner Robins Air Logistics Center awarded the contract for a price of $62,400 while a competitor, the original equipment manufacturer for the gun system who had a good quality reputation with the Logistics Center's engineers, bid $62,700. The contracting officer told us that the basis for the award was price.

That is an unacceptable situation and sends the wrong signal to our suppliers. One part of the Air Logistics Center gave new work to a contractor, while another part of the same Logistics Center hauled $1.5 million worth of the same contractor's parts to the scrap yard.

The lack of information about a contractor's historical quality performance is even worse when the contractor does business with a different Military Service or other Federal agencies. For example, a Hotline caller alleged that a contractor was reducing the amount of quality control for the production of electronic circuit boards and weapon systems software. At our request, the Army tested some of the electronic circuit boards that the contractor produced and learned that it had about $500,000 worth of circuit boards and electronic components in its inventory that were not usable. We then checked with the Navy and found that it had over $1 million worth of circuit boards with nonconformances. We later found that the same contractor provided the Air Force with a software system that did not work correctly. Further checking showed that the Federal Aviation Administration had electronics and software for a wind shear identification system that did not work properly, and the Coast Guard had quality assurance problems on a software system that it had ordered but was refusing to pay $500,000 to the contractor.

The alarming part of the situation was that none of the Military Services or Federal agencies involved was aware of the others problems. Yet, during our review, the contractor was still being awarded additional contracts. Shortly after we became involved, several contracts were terminated and the Defense Contract Administration Services sent a team of quality assurance personnel to the plant to try to correct the situation.

QUALITY SHOULD BE EQUAL TO PRICE

The Federal Acquisition Regulation provides that contracts shall only be awarded to responsible contractors. Contracts should not be awarded unless the contracting officer makes an affirmative determination of responsibility.

Our review of 64 contracts showed that the basis of award for all contracts was either best price or the only source of supply. There was no evidence that quality was a deciding factor in any of the 64 contract awards. The award of a contract to a supplier based only on lowest price can provide a false economy. We recommended establishing provisions within the Federal Acquisition Regulation that permit the contracting officer to include selective testing requirements in Requests for Proposal, to waive the testing requirements in contract bid proposals for contractors with a documented history of producing quality parts, and to make prior quality performance of the contractor a weighted determining factor in the contract award process. We believe that the process will greatly reduce or eliminate the contractors who have poor records of quality.

TIMELY TESTING FOR QUALITY

In our audit report, we recommend that the Military Services institute statistical based testing programs on spare parts.

Testing programs will provide immediate identification of contractors who produce poor quality, and also provide feedback on the progress of the DoD Total Quality Management Programs. Testing programs will also keep the Department's limited number of Quality Assurance Representatives focused on serious weaknesses in contractor quality control.

A testing program will speed up the Quality Deficiency Reporting process for many nonconforming parts, as well as apply the Quality Deficiency Reporting process to more nonconforming parts.

A testing program will provide contractors who participate in the Total Quality Management Program with timely feedback on the quality of their products.

A testing program may cost additional money in the short run, however, testing will help the Department obtain better quality parts through effective feedback to Government Quality Assurance Representatives and to contractors. Testing will also provide data for use in the Contractor Responsibility Review Program System. In the long run, the DoD will save money on the acquisition and maintenance costs in the future because the conforming parts will not wear out as quickly as nonconforming parts.

ACTIONS TO IMPROVE QUALITY

There is some good news to report regarding the actions by the Department to improve quality. The DoD Quality Assurance Council has initiated several programs to improve quality as part of the Total Quality Management Strategy. The DoD Total Quality Management Strategy has the objective of achieving continuous improvement in quality. Through the application of the Total Quality Management Strategy concept, DoD expects to initiate a cultural change from defect correction to defect prevention, from quality "inspected" into products to quality "designed and built" into the process and product, and from acceptable levels of defects to continuous process improvement. The Department also expects to evolve from almost total reliance on the lowest procurement cost to using optimum life-cycle cost and from emphasis on cost and schedule to emphasis on quality, cost, and schedule.

A DoD Quality Assurance Council Working Group is addressing ways to improve the timeliness and effectiveness of the Quality Deficiency Reporting process. While the process may still have unavoidable delays, the working group is designing a more useful DoD system.

The Assistant Secretary of Defense (Production and Logistics) endorsed an action plan on counterfeit material and unauthorized products substitution. The plan includes corrective and preventive actions to accomplish the purging of material in the supply system and to prevent such material from entering the system in the future.

A planned Defense regulation will address approval by the Material Review Boards of parts with minor nonconformances that can be accepted by DoD. The regulation will require monitoring of contractor quality performance and obtaining price reductions to contracts when quality levels are not achieved. If the regulation had been in effect when the parts in our audit were purchased, there could have been price reductions on the $90 million of parts that were identified to have minor nonconformances.

The Air Force is starting a Competition for Performance Program that formalizes the authority of contracting officers to exercise good business judgment in awarding contracts. The program will allow the contracting officer the latitude to make an award to the offeror who provides the "greatest value" to the Government. Under the program, the contracting officer will consider not only price, but also quality and delivery performance in arriving at an award decision. As a result, the contracting officer may award a contract with a cost up to 10 percent higher than the lowest cost, or up to 20 percent higher if approved by the Director or Deputy Director of Contracting.

Although the plans can improve quality, the DoD has no mechanisms or methodology in place or even planned that will accurately measure the progress of actions to enhance quality.

Mr. Chairman, that concludes my prepared testimony. I will be happy to answer any questions that you or the Committee may have.

JOHN GLENN, OHIO, CHAIRMAN

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United Stat
COMMITTI
GOVERNMENTA
WASHINGTON, DC

April 17, 1989

The Honorable Richard B. Cheney
The Secretary of Defense
The Pentagon
Washington, D.C. 20301

Dear Mr. Secretary:

On April 10, 1989, the Committee on Governmental Affairs heard disturbing testimony from the Defense Department's Office of the Inspector General (IG) concerning an audit of spare parts at the Warner Robbins Air Logistic Center.

According to the IG's testimony, a sampling of items revealed that a substantial percentage of the parts tested did not conform to the specifications required by the Air Force. For example, of the aircraft machine gun parts tested in the sample, only eight percent conformed to the contract specifications. Sixty-five percent were so flawed that they are likely to fail early in their service life, or are simply not usable. Using conservative statistical projections, the IG audit suggests that 13 cents out of every dollar spent for these parts is wasted because they do not meet the specifications. Obviously, the Air Force should not be accepting so many items from its contractors that are substandard or non-conforming.

The information disclosed by the Inspector General implies a serious lack of quality control in the Department of Defense's procurement system. The spare parts reviewed by the IG represent the inventory of only one Air Force logistics center (ALC). I am concerned that a similar situation exists in the spare parts inventory of the other Services in addition to the remaining ALC's.

If the figures of non-conforming parts found at Warner Robbins holds true for other Service logistics centers and depot supplies, then a significant portion of those parts will simply not work when needed in combat. Not only does this imply that the taxpayers are not getting what they are paying for, but it also degrades the ability of our troops to perform in battle.

I believe that the Department of Defense should immediately initiate quality audits of its spare parts inventories in each Service to determine the extent of the problem. This may provide the necessary benchmark to know how serious the quality problems are throughout the military. The Inspector General has neither the funds nor the manpower for this task. I hope that the Department is able to conduct this type of review. If not, the Committee would be happy to work with the Department to consider other means of testing the military's inventory to achieve these results.

Several policy issues may also need to be reviewed. Jack Katzen, the Assistant Secretary for Production and Logistics, did discuss the concept of Total Quality Management at the hearing. However, the need for other managerial changes was not addressed. For example, since the Defense Department is apparently not performing an adequate inspection of the items at the time of acceptance, perhaps the Federal Acquisition Regulations should be changed, or warranties sought, to protect the government's ability to recover contractual or other damages when the problems become manifest.

Thank you for your consideration and cooperation in this important matter. I look forward to your response.

Sincerely,

John Glenn

John Glenn
Chairman

JG/dg

THE SECRETARY OF DEFENSE
WASHINGTON, THE DISTRICT OF COLUMBIA

26 JUN 1989

Honorable John Glenn
Chairman, Committee on Governmental Affairs
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

This responds to your letter of April 17, 1989, concerning spare parts entering the Department of Defense (DoD) supply system which do not conform to contract specifications. I share your concern and view the problem as one which involves personnel safety, weapon system effectiveness, and contractors overcharging the government.

Although the Inspector General's audit was confined to one Air Logistics Center, I believe the problem also exists at other DoD procurement locations. As an initial step towards addressing the issue, we are bringing together the contracting, logistics, engineering, and quality assurance communities within each of the Services and the Defense Logistics Agency to develop a DoD-wide plan to attack the problem. The plan, which we will provide you by mid-July, will address the recommendations cited in your letter.

To mitigate this problem in the future, the DoD must increase efforts, as simple as that sounds, to have contractors comply with the terms and conditions of their contracts and to ensure contractor performance is a prime factor in source selection. Our ultimate goal must be to prevent nonconforming items from ever being produced. To make this happen, both the DoD and the supplier communities must improve and maintain tight quality control over the processes that bring spare parts into the DoD supply system as well as the processes that produce them.

The DoD has a comprehensive management tool that we call Total Quality Management which has relevance to the nonconforming spare parts problem. This approach is patterned after the successful efforts of many commercial companies to improve their competitiveness through the long-term unrelenting pursuit of quality. The DoD plan being prepared embodies this concept and its effective implementation by the DoD offers a means of achieving significant improvement in the quality of our spare parts.

Sincerely,

DEPARTMENT OF DEFENSE

AUDIT REPORT

NONCONFORMING PRODUCTS IN THE DEFENSE SUPPLY SYSTEM AT WARNER ROBINS AIR LOGISTICS CENTER

No. 89-065 April 10, 1989

Office of the
Inspector General

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

April 10, 1989

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT)
COMPTROLLER OF THE AIR FORCE
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Report on the Audit of Nonconforming Products in the Defense Supply System at Warner Robins Air Logistics Center (Report No. 89-065)

This is our final report on the Audit of Nonconforming Products in the Defense Supply System at Warner Robins Air Logistics Center (hereafter called the Logistics Center) for your information and use. Comments on a draft of this report were considered in preparing the final report. We made the audit during the periods from September 1986 to April 1987 and September 1987 to September 1988. The audit time frame was split because the Air Force did not agree to support the audit and release items for testing until August 1987. The objective of the audit was to determine the extent of nonconforming products in the Defense supply system in terms of number and dollar value of items, potential harm to personnel, and degradation of equipment. During the audit, an additional objective was added to determine how contracting and quality assurance practices led to nonconforming products. The audit included random tests of $112.4 million of inventory in three Federal Supply Classes and seven National Stock Numbers in the Hardware Federal Supply Group that was procured, managed, and stored at the Logistics Center.

The parts reviewed were manufactured to specifications cited in DoD drawings and accepted at contractors' plants. To determine the extent of nonconformances, testing of parts at independent laboratories was employed. Characteristics of parts that were not essential to the performance of the part, such as markings, paint color, and minor surface flaws, were not tested for or identified as meaningful nonconformances in this audit. The Logistics Center's engineers reviewed test plans and identified from drawings the essential and critical characteristics of each part, such as dimensions, hardness, and material content. Based on evaluations of test results by the Logistics Center's engineers, the engineers from the Office of the Inspector General, DoD, categorized nonconformances as major or minor. The identified major nonconformances were parts the contracting officer should reject because some characteristics of the parts deviated to such an extent from drawing specifications that there is an adverse effect on the reliability, durability, performance, or interchangeability of the part. The minor nonconformances were deviations to a lesser extent from drawing specifications and individually did not adversely affect reliability, durability, performance, or interchangeability. Multiple minor nonconformances, when considered collectively, can raise the categorization to a major nonconformance. Both the major and minor nonconformances identified should have been previously identified at the contractors' plants, and corrective actions should have been taken by the contractors before the parts were accepted into the Air Force inventory. For major nonconformances, the Logistics Center further tested, evaluated, and categorized the parts as usable or not usable. The Logistics Center then withdrew from its inventory those sample parts categorized as not usable.

Overall, we concluded that the DoD Quality Assurance Program needed improvement and the Air Force did not receive the quality parts it paid for because the parts did not meet contract specifications. Specifically, we projected that 94 percent of the $110.4 million of spare parts in Federal Supply Class 1005 (guns through 30 millimeters), 64 percent of the $0.4 million of spare parts in Federal Supply Class 3130 (bearings mounted), 30 percent of the $1.6 million of spare parts in Federal Supply Class 5120 (Hand Tool Nonedged, Nonpowered), and 96 percent of the $44,000 of spare parts in Federal Supply Group 5300 (Hardware) were nonconforming to essential or critical operational characteristics. We also estimated that $12.9 million of the gun spare parts were not usable. The nonconforming parts occurred because the contractors that supplied the parts failed to satisfactorily control quality, because DoD did not identify the quality control problems, and because nonconforming parts were accepted by the Government and not identified for corrective management actions. At the time of this report, the Air Force was performing additional evaluations of the National Stock Numbers that were categorized as not usable. The identified nonconforming parts did not affect the safety of personnel. The Office of the Secretary of Defense, the Defense Logistics Agency, and the Air Force have initiated several policy actions in FY 1987 and FY 1988 to improve the quality of goods and services acquired from contractors. These initiatives to improve the quality of goods and services should have a positive effect. However, several areas require further improvement. The results of the audit are summarized in the following paragraphs, and the details, audit recommendations, and management comments are contained in Part II of this report.

The DoD Quality Assurance Program did not work adequately for the acquisition of spare parts in two Federal Supply Classes and one National Stock Number in the Hardware Federal Supply Group. We projected that the Logistics Center paid about $14.4 million for spare parts with major nonconformances and $89.5 million for spare parts with minor nonconformances in

Federal Supply Class 1005, $137,000 for spare parts with major nonconformances and $118,000 for spare parts with minor nonconformances in Federal Supply Class 3130, and $19,000 for spare parts with major nonconformances and $23,000 for spare parts with minor nonconformances to contract specifications in Federal Supply Group 5300. Since the same acquisition and quality assurance procedures used to purchase spare parts at the Logistics Center were also used at other Air Force Logistics Centers, similar problems of nonconforming spare parts may exist in other supply classes at other Centers. To improve policies regarding the quality of spare parts acquired, we recommended incorporating policies into draft DoD Directive 5000.XX, "Quality Programs," for a testing and followup program; establishing provisions in the Federal Acquisition Regulation for including selective quality assurance testing requirements in Requests for Proposals and selectively waiving testing requirements for contractors that demonstrate they can produce quality material; and providing additional quality assurance surveillance over contractors with quality problems. We also recommended establishing a postproduction inspection and testing program in the Air Force, improving the quality of data contained in systems contracting officers use to judge contractors' prior quality performance, and standardizing definitions of various quality related terms and definitions. For the sample items identified with major nonconformances, we recommended providing pertinent quality deficiency reports to contract administration offices, and requesting repairs or voluntary refunds from contractors (page 7).

On September 29, 1988, a draft of this report was provided to the Under Secretary of Defense for Acquisition, Assistant Secretary of the Navy (Financial Management), Comptroller of the Air Force, and Director, Defense Logistics Agency. We received comments from the Assistant Secretary of Defense (Production and Logistics), dated December 30, 1988; the Assistant Secretary of the Navy (Shipbuilding and Logistics), dated January 13, 1989; the Deputy Assistant Secretary of the Air Force (Acquisition Management and Policy), dated February 7, 1989; and the Director, Defense Logistics Agency, dated February 6, 1989. The comments are summarized in Part II and in Appendix P of this report, and the complete texts of the responses are included in Appendixes L through O.

In their comments, the Air Force and the Defense Logistics Agency essentially agreed that the verified nonconformances represented unacceptable quality practices and were worthy of management attention. The Air Force and the Defense Logistics Agency asserted that the number of nonconformances, especially major nonconformances, were overstated in the draft report. In addition, both asserted that the statistical sampling methodology was incorrect and that the statistical projections overstated the magnitude of the problem in the DoD Quality Assurance Program.

We reviewed the results of Air Force retests and Material Deficiency Investigation Reports that were provided to us to support the contentions that the number of reported nonconformances, especially major nonconformances, was overstated. We changed the classification to minor nonconformances on 2 of the 10 National Stock Numbers originally classified as major nonconformances. However, the overall number of National Stock Numbers containing nonconforming parts remained the same, and the overall projection of nonconforming parts in each Federal Supply Class remained about the same (Appendix H). We agreed with the Air Force's conclusions on 10 National Stock Numbers. We disagreed with the Air Force's conclusions on the other 36 National Stock Numbers because the conclusions were unsupported, were based on inaccurate or incomplete Material Deficiency Investigation Reports, or were not consistent with the guidance in the Federal Acquisition Regulation.

The Air Force and the Defense Logistics Agency were correct that the quantity of one National Stock Number statistically outweighed the rest of the audit sample. Therefore, we used a statistical smoothing method to reduce the abnormal effect the one National Stock Number had on the entire Federal Supply Class 1005. Details on the revised methodology used to project the sample results are provided in Appendix F.

The response from the Assistant Secretary of Defense (Production and Logistics) did not address the recommendations in the draft report. We request that the Assistant Secretary provide comments on Recommendations 1.a., 1.b., 1.c.(1), 1.c.(2), and 1.d. Based on comments from the Assistant Secretary of the Navy (Shipbuilding and Logistics) and the Deputy Assistant Secretary of the Air Force (Acquisition Management and Policy), we modified Recommendations 1.b., 1.c.(1), and 1.d. for the final report.

The Deputy Assistant Secretary of the Air Force (Acquisition Management and Policy) concurred with Recommendations 2., 3.a., 4.b., and 4.c. and concurred in part with Recommendations 3.b. and 4.a. of the draft report. Additional comments are not required from the Air Force on Recommendations 2. and 4.b. For Recommendations 3.a. and 4.c., the Air Force's reply did not provide an estimated completion date, and we request that the Air Force provide an estimated or actual completion date for these recommendations. We modified Recommendations 3.b. and 4.a. for the final report. We ask that Air Force provide comments on Recommendations 3.b. and 4.a. and the related internal control weaknesses. The response to the draft report from the Air Force on Recommendation 3.a. will resolve the related internal control weakness.

The Assistant Secretary of the Navy (Shipbuilding and Logistics) and Director, Defense Logistics Agency, concurred with

Recommendation 2. of the draft report and described the corrective action taken. No additional comments are required from the Navy and the Defense Logistics Agency on this recommendation.

The audit identified internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular No. A-123, and DoD Directive 5010.38. Controls were not established to ensure that contracting officers had sufficient information to identify readily contractors that provided poor quality on previous contracts. Controls were also needed to require additional testing and inspection requirements in contracts until contractors demonstrate that their products meet contract requirements. Recommendations 3.a., 3.b., and 4.a. in this report, if implemented, will correct these weaknesses. A copy of this report will be provided to the senior official responsible for internal controls within the Air Force.

DoD Directive 7650.3 requires that all audit recommendations be resolved within 6 months of the date of the final report. Accordingly, final comments on the unresolved issues in this report should be provided within 60 days of the date of this memorandum. In order for your comments to be considered responsive, you must state concurrence or nonconcurrence with each recommendation addressed to you. If you concur, describe the corrective actions taken or planned, the completion dates for actions already taken, and the estimated dates for completion of planned actions. If you nonconcur, please state your specific reasons. If appropriate, you may propose alternative methods for accomplishing desired improvements. We are not claiming any monetary benefits in this report.

The cooperation and courtesies provided to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. David Steensma on (202) 693-0186 (AUTOVON 223-0186) or Mr. C. J. Richardson on (202) 693-0400 (AUTOVON 223-0400). Copies of the final report are being provided to the activities listed in Appendix R.

Stephen A. Trodden

Stephen A. Trodden
Assistant Inspector General
for Auditing

Enclosure

cc:
Assistant Secretary of Defense
(Production and Logistics)
Secretary of the Navy
Secretary of the Air Force
Assistant Secretary of the Army (Financial Management)
Director, Defense Acquisition Regulatory Council

REPORT ON THE AUDIT OF NONCONFORMING PRODUCTS IN THE DEFENSE SUPPLY SYSTEM AT WARNER ROBINS AIR LOGISTICS CENTER

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Acquisition Support
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REPORT ON THE AUDIT OF NONCONFORMING PRODUCTS IN THE DEFENSE SUPPLY SYSTEM AT WARNER ROBINS AIR LOGISTICS CENTER

PART I - INTRODUCTION

Background

The Federal Acquisition Regulation provides policies to ensure that supplies acquired through Government contracts conform to the contract's quality requirements. The responsibility for quality in the production of spare parts is divided between the contractor and the Government. The contractor is responsible for controlling the quality of supplies during production and offering to the Government for acceptance only those supplies that conform to contract requirements. Government agencies are responsible for ensuring that supplies offered by contractors meet contract requirements.

DoD places reliance on the contractor's quality control system for ensuring that supplies meet contract requirements. Generally, the quality control system employed by the contractor is determined by the type of quality requirement that is stipulated in the contract. Higher level quality requirements go considerably beyond the standard inspection requirements described in Federal Acquisition Regulation, Part 46. The standard inspection requirement states that the contractor shall have an inspection system satisfactory to the Government. The standard inspection contract clause is generally considered to be satisfactory if the Government believes it will result in satisfactory products. The higher level quality requirements that are specified in contracts covered in our audit are Military Inspection 45208A, "Inspection System Requirements" (MIL-I-45208A), and Military Quality 9858A, "Quality Program Requirements" (MIL-Q-9858A).

The contractor responsibilities for MIL-I-45208A are to provide an inspection system to ensure that all supplies or services will conform to contract requirements. The inspection system must be documented and available for a Government representative's review before production and throughout the contract. After a review of the system, the Government may furnish written notice of the acceptability or nonacceptability of the system. Additional requirements are documentation and inspection of records, test equipment, and process controls as specified. A contractor that implements the higher level requirements for MIL-Q-9858A automatically must meet the inspection system requirements in MIL-I-45208A. In addition to the MIL-I-45208A inspection and testing requirements, MIL-Q-9858A emphasizes quality management, and purchasing and manufacturing controls.

Defense contracting officers rely on Government quality assurance representatives to perform reviews of contractor quality control systems to ensure that goods and services conform to contract requirements. The reviews include examinations of contractor quality control procedures, and inspections and contractor actions to correct deficiencies. Government quality assurance representatives are assigned either to plant representative offices at production facilities of large contractors or to Defense Contract Administration Services Management Areas as in-plant or itinerant quality assurance representatives servicing numerous smaller contractors.

The DoD initiated actions in 1987 and 1988 to improve the quality of parts purchased. The DoD Quality Assurance Council was formed to coordinate the separate efforts of the Services and the Defense Logistics Agency to improve quality through their joint participation on the Council. The Council has initiated several different tasks to improve quality. Some of these tasks were started as part of a Total Quality Management strategy initiated by the Office of the Assistant Secretary of Defense (Production and Logistics). The purpose of Total Quality Management is to develop and implement a Total Quality Management process throughout the DoD establishment and within DoD contractor/supplier facilities. Total Quality Management was designated as a management priority in the FY 1989 DoD Management Improvement Program. As such, a Deputy Assistant Secretary of Defense for Total Quality Management was established in the Office of the Assistant Secretary of Defense (Production and Logistics). In addition to the Total Quality Management initiatives, the Assistant Secretary of Defense (Production and Logistics) has reacted to the recent identification of nonconforming products in civil and criminal product substitution cases. The Assistant Secretary initiated an action plan on June 21, 1988, to address counterfeit material and unauthorized substitutions. Aside from the OSD actions, the Air Force and Defense Logistics Agency formulated a policy on equitable price reductions from contractors for minor nonconformances. Also, the Air Force has provided contracting officers the latitude to consider prior quality performance when awarding contracts, and developed an automated system that allows contracting officers to review contractors' prior performance on DoD contracts. Details of these DoD actions to improve quality are shown in Appendix A.

Warner Robins Air Logistics Center (the Logistics Center) is one of five Air Logistics Centers in the Air Force Logistics Command that provides logistics support to the Air Force. In FY 1987, the Logistics Center employed about 20,000 persons. The Logistics Center's mission includes the management of over 200,000 National Stock Number items ranging from gunnery equipment to sophisticated communications and electronics equipment. The cost of spare parts equipment and components that the Logistics Center acquired in FY 1987 was about $2.09 billion.

Objectives and Scope

The objective of the audit was to determine the extent of nonconforming products in the Defense supply system in terms of number and dollar value of items, potential harm to personnel, and degradation of equipment. During our audit, an additional objective was added to determine how contracting and quality assurance practices led to nonconforming products. Because of time constraints and the need for additional engineering and industrial specialist support, we did not attempt to determine: the dollar value effect of the nonconformances on each part, the differences in the quality of parts provided by small businesses versus large businesses, and whether material specifications contained in the contract requirements were excessive to the functional requirements of the parts.

The original scope of the audit was to examine 186 National Stock Numbers contained in 16 Federal Supply Classes at Warner Robins Air Logistics Center and at two other Air Logistics Centers (Appendix B). The Logistics Center was selected to be the pilot site for the audit. The audit universe, consisting of 685,925 parts, was limited to serviceable assets procured, managed, and stored at the Logistics Center and received between October 1, 1984, and September 30, 1986. The statistical sampling plan and methodology is included in Appendix F. In August 1987, a mutual agreement between the Air Force Logistics Command and the Office of the Inspector General, DoD, reduced the scope of the audit to 46 National Stock Numbers and limited the cost of testing to $100,000. The scope was reduced to determine whether a more comprehensive testing program was justified.

The 46 National Stock Numbers were in 3 Federal Supply Classes (guns through 30 millimeters; bearings, mounted; hand tools that are nonedged, nonpowered) and 7 National Stock Numbers in the Hardware Federal Supply Group. The value of the collective universes, based on standard unit prices, was approximately $112.4 million (Appendix C). From the 46 National Stock Numbers, 1,027 parts were randomly selected from the Logistics Center's inventory. Test plans for the parts were prepared by specialists from the Defense Industrial Supply Center and were evaluated by engineers from the Logistics Center. Independent laboratories used these test plans to test 374 of the 1,027 parts. The tests were for conformance to contract requirements for dimensional, hardness, and material content specifications. If DoD engineers or contractors questioned the test results for the parts, those parts were retested at a second laboratory to confirm the results. The nonconformances for each part were categorized as either major or minor based on the following guidelines:

- the Federal Acquisition Regulation, Part 46; and

- the evaluations of test results by engineers from the Defense Industrial Supply Center, the Logistics Center, and the Office of the Inspector General, DoD.

The engineers from the Office of the Inspector General, DoD, made the final decision on the categorization for each part with a nonconformance.

For the National Stock Numbers selected, we examined 64 contracts and delivery orders awarded to 36 contractors during 1980 to 1986. We also evaluated the internal controls related to quality assurance in the preaward and postaward stages of the 64 contracts. In addition, we performed on-site reviews of the contractors' quality control practices and DoD's plant representative quality assurance procedures for 32 of the 64 contracts and delivery orders at 15 of the 36 contractors' production facilities.

A review of the internal control program documentation and its implementation showed that internal controls were inadequate to identify contractors with prior problems of producing quality spare parts before the award of contracts. Further, internal controls were not adequate to ensure the identification of unusable spare parts or spare parts with major nonconformances before acceptance into the inventory at the Logistics Center. Recommendations 3.a., 3.b., and 4.a., if implemented, will correct these weaknesses.

The audit was conducted from September 1986 to April 1987 and from September 1987 to September 1988. The audit time frame was split because the Air Force did not agree to support the audit and release items for testing until August 1987. This economy and efficiency audit was made in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD, and accordingly included tests of internal controls as were considered necessary. Activities visited or contacted during the audit are listed in Appendix Q.

Prior Audit Coverage

There has not been specific audit coverage on determining the extent of nonconforming products in the DoD. However, there has been audit coverage by the Office of the Inspector General, DoD, and the General Accounting Office addressing quality assurance issues and defective parts. Eight of the reports are listed below and described in detail in Appendix D.

Office of the Inspector General, DoD, Report No. 84-018, "Procurement Quality Assurance of Material Receipts by Corpus Christi, Texas, Army Depot," December 7, 1983, reported that a contractor shipped $3 million of defective helicopter parts to the Corpus Christi Army Depot.

Office of the Inspector General, DoD, Report No. 85-054, "Defective Parts on the Navy's Light Airborne Multi-Purpose System MK III Program," December 17, 1984, indicated that defective parts were not always reported nor investigated.

Office of the Inspector General, DoD, Report No. 86-131, "Processing of Quality Deficiency Reports in the Defense Logistics Agency," August 28, 1986, concluded that more than 50 percent of Quality Deficiency Reports sent to the Defense Logistics Agency were inaccurate or inadequate.

General Accounting Office Report No. NSIAD-87-33 (OSD Case No. 7180), "Quality Assurance Efforts to Strengthen DoD's Program," was issued on November 3, 1986. The report stated that quality assurance programs of plant representative offices and Defense Contract Administration Services field offices do not fully implement Federal Acquisition Regulation requirements to perform all actions necessary to verify whether the supplies or services conform to contract quality requirements, or to discourage the repeated offering of nonconforming supplies and services.

Office of the Inspector General, DoD, Report No. 87-083, "Follow-on Audit of Known But Unreported Defective Material," February 11, 1987, concluded that the number of known defective items going unreported was comparatively small.

General Accounting Office Report No. NSIAD-B230506 (OSD Case No. 7585), "Quality Assurance Procedures for Fiber Optic Cables Used by DoD," March 31, 1988, stated that the Air Force experienced problems with broken fiber optic cables, but its Quality Deficiency Reporting System failed to follow through to a satisfactory conclusion.

General Accounting Office Report No. NSIAD-88-104 (OSD Case No. 7451), "Quality Assurance - Concerns About Four Navy Missile Systems," March 24, 1988, evaluated quality assurance issues on the Phoenix, the High-Speed Anti-Radiation Missile, the Harpoon, and the Sparrow Missile Systems. All four missile systems failed to conform with some contract specifications due to inadequate manufacturing processes.

General Accounting Office Report No. NSIAD-89-28FS (OSD Case No. 7767), "Procurement - Department of Defense Quality Assurance Efforts," November 2, 1988, stated that DoD has no real means to test and determine the success of its quality assurance program.

PART II - FINDING AND RECOMMENDATIONS

Nonconforming Spare Parts

FINDING

The DoD Quality Assurance Program did not work adequately for the acquisition of spare parts in two Federal Supply Classes and one National Stock Number in the Hardware Federal Supply Group at Warner Robins Air Logistics Center (the Logistics Center). Inconsistent terms and definitions were used to describe a nonconformance and its degree of magnitude. Contractors did not adequately implement stated quality control procedures. In addition, Government quality assurance representatives did not identify and reject the contractors' inadequate quality control practices. Recurring Material Review Board actions occurred without receipt of corrective action plans. The Quality Deficiency Reporting System and a Contractor Responsibility Review Program system provided untimely and very limited information on contractors' prior quality performance. Furthermore, additional contract requirements for conformance testing of essential supply items before source acceptance were not identified in Logistics Center contracts. As a result, we projected that 94.1 percent of the $110.4 million of parts in Federal Supply Class 1005 (guns through 30 millimeters), 64.4 percent of the $395,678 of parts in Federal Supply Class 3130 (bearings, mounted), and 96.3 percent of the $43,569 of parts in the Federal Supply Group 5300 (hardware) had major and minor nonconformances to contract specifications. Furthermore, the contracting officer should not have accepted from the contractor the parts with major nonconformances. We also estimated that about $12.9 million of the spare parts in Federal Supply Class 1005 were not usable. The Air Force did not receive the quality parts that it paid for from the contractors. The Logistics Center's acquisition and acceptance procedures for spare parts are also used at other Air Force Logistics Centers. Therefore, similar problems of nonconforming spare parts may exist in other supply classes at other Centers.

DISCUSSION OF DETAILS

Background. Nonconforming products are addressed in Part 46 of the Federal Acquisition Regulation. Part 46 discusses the responsibility of the contracting officer and provides that contracting officers should reject supplies not conforming in all respects to contract requirements. Specifically, the contracting officer shall ordinarily reject supplies or services when the nonconformance is major.

Part 46 of the Federal Acquisition Regulation also prescribes policies for when a nonconformance is minor and does not affect any of the reasons for ordinary rejection before Government acceptance. For minor nonconformances, the cognizant contract administration office may establish a joint contractor-contract administration office review group, commonly known as a Material Review Board. The contractor's Material Review Board representatives review, evaluate, and recommend disposition of parts with minor nonconformances to a Government quality assurance representative. The quality assurance representative can accept or reject the recommendations of the contractor. However, parts with major nonconformances that the contracting officer should ordinarily reject are outside the scope of the Material Review Board.

Definitions. Parts that do not conform to contract specifications are called nonconformances or defects. Nonconformances and defects are commonly classified as major or minor. The Federal Acquisition Regulation (FAR) does not define a major nonconformance. However, the FAR states that nonconformances should be rejected before acceptance if they would adversely affect safety, health, durability, performance, interchangeability of parts or assemblies, or any other basic objective of the specification. Further, the FAR states that nonconformances that do not meet the criteria for automatic rejection are classified as minor. The Defense Logistics Agency (the Agency) Regulation 8200.10, "Control of Nonconforming Material," defines a Type II Nonconformance with the same definition the FAR uses for a minor nonconformance. The Agency Regulation 8200.10 also defines a Type I nonconformance in the same words the FAR uses for a nonconformance that is to be rejected. When defining what is a minor nonconformance, contractors, Government quality assurance representatives, and Air Force material management engineers commonly refer to definitions in the Military Standard 109B, "Quality Assurance Terms and Definitions," and Military Standard 1520C, "Corrective Action and Disposition System for Nonconforming Material." Also, contractors and material management engineers sometimes substitute the definitions of major defects for major nonconformances.

The interpretation of the definitions in the Military Standards for a minor or major nonconformance or defect sometimes varies from the definition provided in the FAR. For example, the definition of a major defect in Military Standard 109B, as a nonconformance ". . . likely to result in failure or to reduce materially the usability . . .," of an item, is often substituted for the definition of a major nonconformance. Parts that contain minor and major nonconformances may still be used on an aircraft. These parts are called serviceable, but may have limitations placed on their use. Unserviceable parts are categorized as either repairable or condemned. The lack of standard terms created confusion for the personnel in the OSD, Office of the Inspector General, Defense Logistics Agency, Air Force, contract administration offices, and contractors' organizations. Several commonly used definitions for major and minor nonconformances, Type I and Type II nonconformances, defects, and serviceable and unserviceable conditions are included in Appendix E. For this audit report, we used the FAR guidance as criteria. For nonconformances that the FAR states should be rejected, we called the nonconformances major. We also used the FAR definition of a minor nonconformance for minor nonconformances cited in the report.

Statistical Sample. To evaluate the quality of spare parts in the inventory, we sampled from the Logistics Center's on-hand war reserve and serviceable parts. From the three Federal Supply Classes, we randomly selected 39 of the 2,209 National Stock Numbers. For the 39 National Stock Numbers, we randomly selected 642 parts from 673,334 parts valued at $112.4 million. The seven National Stock Numbers in the Hardware Federal Supply Group were judgmentally selected, but the 385 parts were randomly selected from 12,591 parts valued at $43,569. Once the parts were selected, they were locked in a secured area and were under the control of personnel from the Office of the Inspector General, DoD, until August 30, 1988. The sample results are statistically projectable to the universe values for each of the three Federal Supply Classes and for each of the seven National Stock Numbers in the Hardware Federal Supply Group. Additional details on the sampling plan and statistical methodology are included in Appendix F. Details on the universe and sample are in Appendix C.

Testing Methodology. The Test and Evaluation Division of the Defense Industrial Supply Center (the Supply Center) provided engineering support to develop the testing methodology. We obtained support from the Supply Center after the Air Force denied our initial request for engineering and testing support.

The Supply Center's specialists prepared test plans based on the appropriate drawings and specifications cited in the contract for each National Stock Number in our review. The test plans included the essential and critical characteristics for each of the 46 National Stock Numbers. The engineers at the Office of the Inspector General, DoD, and the Logistics Center reviewed, revised, and approved the test plans. The test plans did not contain test requirements for every specification cited in the contract's drawings. The plans included tests for dimensional, physical, and material content characteristics that the Logistics Center's engineers determined essential and critical to the functioning of parts.

The Supply Center's Test and Evaluation Division selected the independent laboratories. The auditors shipped the parts and test plans to the laboratories. The test results were sent back to the Supply Center's specialists who made the initial analysis of the tests. Subsequently, engineers from the Office of the Inspector General, DoD, and systems engineers from the Logistics Center evaluated the analyses of the test results. Based on the Logistics Center's engineers' evaluations, an engineer from the Office of the Inspector General, DoD, determined if the nonconformances were major or minor.

To determine how the material was accepted into the DoD supply system, the audit was extended to the Defense Contract Administration Services Offices, Navy Plant Representative Offices, and contractors' facilities that had supplied the material with nonconformances categorized as major. If the contractors could show reasons for questioning the original laboratory test results, the items were retested at a second laboratory to determine if the original test result was correct. In addition, the Air Force retested 13 National Stock Numbers to determine if the parts were usable.

Summary Test Results. Either minor or major nonconformances to contract requirements were found for 40 of the 46 sample National Stock Numbers tested. A description of each National Stock Numbered item and the test results for each item are in Appendix G. The projections for the audit universe for each of the three Federal Supply Classes and the seven National Stock Numbers in the Hardware Federal Supply Group are in Appendix H. For each sampled part with a major nonconformance, details on the parts, contract, contractor, and test results are in Appendix I.

The Air Force agreed that the contractors did not produce the high quality that was specified and paid for in the contracts. The acceptance of parts with nonconformances and failure to identify and take prompt action to correct the system that produced and accepted nonconforming parts sends the incorrect message to contractors. The Air Force should request that contractors who supplied the nonconforming parts should provide repairs at no cost to the Government or voluntary refunds, should identify how the nonconformances occurred, and should report on how quality control practices were revised to prevent future occurrences. Unless nonconforming parts are identified and contractors are informed of their production of nonconforming parts, the contractors will not provide the value paid for through upgrading of quality control practices and production processes. Nonconforming parts also increase maintenance costs for the Air Force. Further, because nonconforming parts wear out faster than parts built to specification, additional parts must be purchased. The additional parts are often purchased from the same contractors that produced the original nonconforming parts.

Details of test results for each of the three Federal Supply Classes and the items selected from the Hardware Federal Supply Group follow.

Guns Through 30 Millimeters. Based on the test results for the sample, we projected that major nonconformances occurred in 423,741 spare parts, valued at about $14.4 million, of the 647,922 spare parts, valued at $110.4 million, in Federal Supply Class 1005 (guns through 30 millimeters). Further, minor nonconformances occurred in 171,699 spare parts, valued at about $89.5 million, in the supply class. The major nonconformances that were detected will affect the performance, durability, or effective use of the part. Within this Federal Supply Class, there was a large difference between the percentage of parts in the universe with major nonconformances (65 percent) and the percentage of dollars in the universe spent on the parts with major nonconformances (13 percent). This difference occurred because major nonconformances were not detected in the more expensive gun parts assemblies.

Because of the large percentage of nonconformances in Federal Supply Class 1005, the Logistics Center should initiate additional testing and inspection requirements in contracts for parts in this supply class. The testing and inspection could occur at the contractor's plant with on-site verification by Government quality assurance representatives, with independent commercial laboratories, at DoD laboratories, or at destination acceptance at depots. In addition, the Logistics Center should request Government quality assurance representatives to provide additional surveillance of the contractors. The additional surveillance should include inspections of subcontractor supplied material, inspections of in-plant manufacturing processes, verification of the adequacy of test equipment used, and determination of the independence of the quality control function.

Bearings, Mounted. Based on the test results for the sample, we projected that major nonconformances occurred in 737 spare parts, valued at about $137,000, of the 2,409 spare parts, valued at $396,000, in Federal Supply Class 3130 (bearings, mounted). In addition, we projected that minor nonconformances occurred in 744 parts, valued at about $118,000, in the Federal Supply Class. The sample bearings should have been rejected because of numerous dimensional nonconformances and "poor workmanship" evidenced by rough surface areas in "O" ring grooves. The Logistics Center disagreed with our assessment and apparently the contractor's own assessment of a major nonconformance for sample no. 37. The details of this major nonconformance are in Appendix I, page 16. Also, 744 spare parts, valued at about $118,000, contained minor nonconformances that were not detected before acceptance. The Logistics Center's engineers judged that the minor nonconformances did not adversely affect the performance, durability, or effective use of the parts. However, the minor nonconformances were recorded against essential characteristics of the parts and indicated that the manufacturing processes were not within dimensional specifications. In response to the draft report, the Logistics Center reported these nonconformances on Quality Deficiency Reports to contract administration offices for corrective action at contractors' plants.

Hand Tools, Nonedged and Nonpowered. Based on our statistical sample, we estimated that 28 percent of the 23,003 hand tool parts contained minor nonconformances and 22 percent conformed to specifications. Tools in 7 of 10 National Stock Numbers tested were not within dimensional specifications. However, the Logistics Center's engineers believed that the tools would still function satisfactorily and would have recommended acceptance of the part. The quality of one National Stock Number that accounted for about 50 percent of the parts in the audit universe could not be readily determined because sufficient data needed to test the item were not available. Because of the minor effect of nonconformances in this Federal Supply Class, we decided not to pursue obtaining certain proprietary data that one contractor was unwilling to provide. The data were needed to test a crimping tool. A functional test of the crimping tool demonstrated that the tool functioned adequately.

Hardware. Seven National Stock Numbers were selected for testing from the Hardware Federal Supply Group because fasteners (bolts) were major product substitution problems at other National Inventory Control Points. Each of these National Stock Numbers was judgmentally selected and had relatively large inventory balances. Of the seven National Stock Numbers, one contained a major nonconformance, five contained minor nonconformances, and one totally conformed to contract specifications. The major nonconformances occurred on a bolt (sample no. VS-1) that did not have a chamfer. The required chamfer was missing on all 766 bolts, valued at $19,142. The Logistics Center disagreed with our assessment of a major nonconformance for the bolt. Details are in Appendix I, page 18. The five National Stock Numbers with minor nonconformances accounted for 11,551 spare parts, valued at $22,842.

Contractors' Quality Control Practices. Our review at 15 contractors showed that 11 contractors failed to implement adequate quality control inspection procedures for 21 of the 32 contract delivery orders (hereafter referred to as contracts). We determined that controls over subcontractor performance were weak, adequate manufacturing inspections were not always performed, appropriate test equipment and fixtures were not always used, the independence of some contractors' quality control functions was weak, and recurring minor nonconformances were not adequately explained nor was appropriate corrective action taken. A quantitative summary of the contractor visits is in Appendix J, and a summary of quality control weaknesses is in Appendix K.

Subcontractor Supplied Material. Subcontractors participated in 17 of the 32 contracts and provided nonconforming material on 13 contracts on which they participated in the manufacturing process. Subcontractor participation ranged from less technical functions, such as applications of protective coatings or heat treatment of metals, to complete fabrication and construction of assemblies containing numerous parts. For example, during our visits to two prime contractors, neither used adequate test fixtures to determine whether the subcontractors had provided conforming retainer partitions (sample no. 8). Also, we determined that neither prime contractor performed any scheduled quality control inspection of the subcontractors' quality control to ensure that the parts conformed to the contract requirements. Additional details are in Appendix I, pages 7 and 9.

The adverse effects of the nonconforming retainer partitions were documented in a field generated Quality Deficiency Report prepared at Luke Air Force Base, Glendale, Arizona, in February 1988. The report stated that during scheduled maintenance, the retainer partitions were installed in the ammunition drum on a F-15 fighter aircraft. It was determined that these parts did not fit properly and would not hold the ammunition in the drum correctly. Maintenance personnel then used retainer partitions, not included in our review, from a third supplier, and all fitted properly.

Contractor Inspection Practices. We determined that 11 of the 15 contractors had not implemented adequate quality control inspection practices on 16 of 32 contracts. For example, we found that the quality control practices employed at one contractor's facility failed to detect dimensional nonconformances that occurred in the manufacture of retaining bearings (sample no. 37). Because quality control personnel did not perform in-process inspections of machine operators' work, did not have control of the cutting tools, and did not employ a manufacturing process control system, there was not adequate assurance that the manufactured parts conformed to the required dimensions. Additional details are in Appendix I, page 16. Another example of inadequate contractor inspection practices was found at a company that failed to detect numerous dimensional nonconformances in gun feeder covers (sample no. 17), which are used to keep dirt out of 20-millimeter gun systems. No dimensional measurements were made during manufacture. Laboratory tests showed that as many as 10 different dimensions nonconformed to contract specifications. Additional details are in Appendix I, page 10.

Test Equipment and Fixtures. We determined that 5 of 15 contractors for 6 of the 32 contracts did not maintain adequate test equipment and fixtures to measure completed parts accurately. Inadequacies ranged from having limited testing devices to a total lack of test fixtures. For example, at one contractor's plant, an engineer from the Office of the Inspector General, DoD, concluded that the contractor did have some gauges and measuring devices. However, the accuracy of the gauges and devices was limited, and the gauges and devices could not verify that certain dimensions on a link loader for the GAU-2B/A gun met required dimensional specifications to the nearest one-thousandth of an inch. Also, as previously discussed in the "Subcontractor Supplied Material" paragraph, neither of the two contractors that provided the retainer partitions used the necessary test fixtures to ensure that the parts conformed to dimensional specifications.

Independence of Quality Control Function. DoD Quality Assurance and Reliability Handbook 50, "Evaluation of a Contractor's Quality Program," prescribes that personnel performing quality functions should have sufficient organizational freedom to identify and evaluate quality problems. However, the quality control functions at 3 of the 15 contractors for 3 of the 32 contracts were not properly segregated. At two of the contractors we visited, the presidents of the companies were also the directors of the quality control functions. At a third company, the vice president also acted as the quality control representative for the company. Separation and independence of top management or the production department from the quality control responsibilities was needed to help ensure that production quotas or company profits do not override the need to produce high-quality products.

Recurring Minor Nonconformances. During the audit, the Defense Logistics Agency published Regulation No. 8200.10, "Control of Nonconforming Material," June 1987. The regulation addressed the use of Material Review Boards and provided procedures for the control of recurring minor nonconformances through a systematic determination of equitable price reductions. This regulation was published before the Air Force drafted Regulation No. 74-18, "Quality Improvement and Nonconformance Reduction." The DoD Quality Assurance Council decided that a single joint Service regulation should be issued to eliminate possible sources of confusion for Defense contractors. Based on our observations and reviews at contractors and our discussions with Government quality assurance experts, there is a need for a joint regulation that addresses Material Review Board actions.

At one contractor's facility, we reviewed 11 Material Review Board decisions that were made between February 1985 and

November 1987 that related to an apparent critical nonconformance on a landing gear bearing for the F-15 fighter aircraft. We found three instances where the Board determined that bearing dimensions outside of the acceptable specification range were acceptable and did not require corrective action or rework of the part. The Navy Plant Representative Office's quality assurance representative accepted the Material Review Board's rulings and did not require any action. We also noted that an additional eight different Material Review Boards reviewed the same nonconformance, and each time the Board recommended that the part be reworked. Personnel from the Navy Plant Representative Office also accepted the actions of these Material Review Boards. It was not until our visit in November 1987, when we pointed out the problem, that the contractor executed an engineering change order affecting all future orders for the bearing. An engineering change to the drawing specifications and revision of dimension specifications for the bearing were the appropriate corrective actions. An engineering change executed earlier would have lowered costs for the bearing because dimension specifications were reduced from ten one-thousandths of an inch to one-thousandth of an inch. Also, if the policies in the Defense Logistics Agency Regulation No. 8200.10 had been in effect in 1985, the Naval Plant Representative Office responsible for this contract would have been required to ensure that corrective action had been taken. Therefore, an engineering change would have been issued after the first Material Review Board meeting.

We also noted problems with corrective actions at another contractor's facility where we reviewed the recorded Material Review Board actions. Although a standard form was used, the description of the nonconformance was largely noncommunicative. We noted that several characteristics on the same parts had continuing problems with nonconformances, but we were unable to determine from the standard form what corrective action had been taken. The Material Review Board recommendations for nonconforming products should completely and clearly state the problem, the nature of the nonconformances, and precisely what corrective actions will be taken. The responsibility of the Government quality assurance representatives should be to determine that corrective actions are accomplished. The present system did not require the appropriate care that should accompany adjustments and exceptions to higher level quality requirements in contracts.

Available Data on Quality. We determined that contracting officers at the Logistics Center did not have efficient access to information needed to identify contractors that have provided poor quality parts on previous Air Force or other Defense contracts. Air Force contracting officers used the Quality Deficiency Reporting System and the Contractor Responsibility Review Program, neither of which provided adequate data for this purpose. An effective system should immediately provide contracting officers with the historical data on the quality of parts previously provided. To not award a contract to a particular contractor, Logistics Center and Air Force Logistics Command managers informed us that contracting officers needed the equivalent of an affirmative determination that a contractor cannot deliver quality. Details related to the lack of data provided by the two systems are discussed below.

Quality Deficiency Reporting System. DoD Directive 4155.1, "Quality Program," requires the Services to maintain a product deficiency reporting and data feedback system. The purpose of the system is to provide for cross reporting of nonconforming parts between the Services and the Defense Logistics Agency, provide necessary corrective actions throughout the acquisition and support process, and provide maintenance of contractor quality history.

The Air Force Quality Deficiency Reporting System does not provide an adequate data feedback system nor a reflection of the quality of spare parts provided to the field. The Air Force has historically had problems getting field activities that use the spare parts to prepare Quality Deficiency Reports. In addition, there is a built-in time lag of over a year from when a part is delivered from a contractor until a report may be initiated. Also, the System does not identify and report on parts that fail before the end of their engineering life expectancy or parts that have durability problems.

This audit did not specifically review why Quality Deficiency Reports are not submitted on defective parts. The condition was documented in a previous audit report by the General Accounting Office. As noted in Appendix D, the General Accounting Office reported that the Air Force failed to report that the Tactical Air Command had 14 documented broken fiber optic cables.

Three of the National Stock Numbers in our sample were reported through the Quality Deficiency Reporting System. The retainer partition (sample no. 8) was not reported until 17 months after the part was accepted (discussed in the paragraph "Subcontractor Supplied Material"). In the test results for sample no. 8, retainer partitions supplied from a second contractor had similar major nonconformances to the retainer partitions on the Quality Deficiency Report for the first contractor. However, the parts from the second contractor were not yet reported on a Quality Deficiency Report. A Quality Deficiency Report on a scoop shaft assembly for the M61 gun (sample no. 5) was initiated 14 months after the part was accepted and was under investigation during the audit. A Quality Deficiency Report was also submitted on an Aft Structure Assembly, costing $8,439, for the GPU 5/A gun (sample no. 6) on a contract outside the scope of our universe. This Quality Deficiency Report was submitted 13 months after the part was received from the contractor, and an investigation of the report was closed after the Aft Structure Assembly with the defect was reported as lost. The Air Force did not examine any other Aft Structure Assemblies to determine if the reported defect was common to other assemblies.

These three examples confirm the findings of the DoD Quality Assurance Council Working Group to Improve the Quality Deficiency Reporting Process that Quality Deficiency Reports are often submitted more than 1 year after the part is accepted from the contractor. This time lag occurs because the Air Force Logistics Centers purchase parts in quantities to meet stockage requirements of over 1 year. As a result, once a part is purchased it may sit on the shelf at a depot for 12 or more months before the part is shipped to an Air Force activity for use on an aircraft. Because of this built-in delay, it is often over 1 year before a problem part is identified. The initial contract deliveries may have been completed, and a follow-on contract could have been awarded to a contractor that previously submitted parts of inferior quality.

Quality Deficiency Reports do not identify durability problems that are the result of poor quality in the manufacturing process. A Quality Deficiency Report will identify spare parts that cannot be initially installed or used because the parts do not pass form, fit, or function tests during installation. A spare part that breaks immediately after installation will also be identified on a Quality Deficiency Report. However, spare parts that fail to meet their engineering life expectancy will not be identified on a Quality Deficiency Report. For example, parts in our sample with major nonconformances failed hardness, strength, and dimensional tests, and engineers' analyses stated that the parts will fail prematurely or lack durability. This will result in gun parts that may have been designed to last for 100,000 rounds of fire to fail after 25,000 to 50,000 rounds of fire. A maintenance technician would not have any idea how many rounds were fired before a part is replaced. Thus, the technician would not fill out a Quality Deficiency Report, and systems engineers or contracting officers will not be made aware of a quality problem.

A DoD Quality Assurance Council Working Group to Improve the Product Quality Deficiency Reporting Process has recognized problems regarding the implementation of DoD Directive 4155.1. Specifically, the working group is attempting to improve the timeliness and effectiveness of the DoD Deficiency Reporting Process, improve exhibit control and disposition, improve the corrective action process, improve data exchange between Components, and improve contractor participation in the process.

Contractor Responsibility Review Program System. The Contractor Responsibility Review Program does not contain adequate historical information on contractor quality performance. The concept of the system was to provide contracting officers data on whether a contractor had quality performance problems on prior contracts. The system is to collect data primarily from contract administration offices and Quality Deficiency Reports that reflect contractors' poor quality performance. The system was established in January 1987 and lacks adequate hard data for contracting officers to make negative decisions on awarding a contract based on prior quality performance problems. For example, the three Quality Deficiency Reports on parts in our sample were not in the system. In another case, a historical review of one contractor in our sample showed that there were prior problems with quality performance but details were not in the Contractor Responsibility Review Program System.

In May 1986, a Quality Deficiency Report was initiated on a conveyor element for the 30 millimeter Gatling gun. A subsequent investigation showed that the Air Force had thousands of defective conveyor elements in its inventory, costing about $1.5 million. The part had been reported earlier, in 1983, on a Quality Deficiency Report. The contractor agreed to replace a few parts but did not change quality control practices. After the conveyor elements were found to be defective in 1986, the contractor refused to replace the parts because Government acceptance of the parts was final. During the investigation, the contractor did request a field test fixture to test his parts. According to Air Force engineers, the field test fixture was not adequate for thorough manufacturing quality control. An Air Force engineer's review of the contractor's test fixture showed that the contractor's fixture for manufacturing was not as good as the Air Force's field test fixture. The Air Force determined that no further action could be taken and closed the Quality Deficiency Report without a report on nonresponsibility recorded against the contractor in the Contractor Responsibility Reporting Program. As of August 1988, the Logistics Center showed $1.1 million of conveyor elements the contractor produced that could not be issued from the Air Force inventory.

At the time of our review, the Contractor Responsibility Review Program did not have data on the Quality Deficiency Report or any other details on the Air Force engineer's evaluations of the contractor's quality performance on the defective conveyor elements.

Timely Testing for Quality. The DoD and the Air Force need timely feedback on quality. The Quality Deficiency Reporting System does not function as a timely feedback system. A selective testing program should be instituted before acceptance of parts. This testing can be performed at contractor's plants, independent laboratories, or DoD laboratories. The results of the testing can provide the timely information needed by contracting officers and contract administration offices to react to poor quality parts offered by contractors. The draft DoD Directive 5000.XX, "Quality Program," is a logical place for this new guidance because it prescribes that each Service and the Defense Logistics Agency should develop an effective data feedback system. If a testing program is instituted, it is logical that policies prescribe guidance for contract administration offices to receive feedback on the results of testing. This timely feedback on testing permits contract administration offices to focus quality assurance representatives on the problems. The representatives can then require contractors to correct quality control and production processes.

The problems identified indicated that the Air Force should initiate some type of postproduction testing. The tests should focus on selected items that are used on tactical end items, and are procured against higher level quality requirements. Because of the safety related nature of some spare parts, the program should emphasize reviews of spare parts that are categorized as safety critical. In addition, the program should apply cost-effective testing procedures for both destination and source acceptance. The testing program should include statistical sampling and the utilization of the various testing resources available at independent commercial laboratories that are suitable for making basic dimensional, physical, and chemical tests. Complex assemblies and other sophisticated spare parts should primarily be tested at the original equipment manufacturer's plant before acceptance. These tests can and should be waived for contractors that affirmatively demonstrate the ability to deliver quality parts that conform to contract specifications. A testing program does cost additional money. However, testing will help the Air Force obtain conforming parts through effective feedback to Government quality assurance representatives, and contractors and will provide data for use in the Contractor Responsibility Review Program. Furthermore, the Air Force will save money on the acquisition of parts and maintenance costs in the future because the conforming parts will not wear out as quickly as nonconforming parts.

Award of Contracts. To improve contractors' compliance with quality, contracting officers need the option of exercising or waiving additional testing in contracts when making award decisions. At present, contracting officers may have to make an award decision when there is either little information or derogatory information about prospective contractors' prior quality contract performance. The proposed option will assist in ensuring that quality spare parts are obtained while preserving fairness in competition. In our proposed option, additional testing requirements would be placed in Requests for Proposal documents and contractors would structure their bids to includethe cost of performing the tests. When making the award decisions, the contracting officer should be permitted to waive the test requirements and eliminate the cost of the tests from the bid and contract when the selected contractor has an excellent prior history of delivering quality products. Conversely, the tests and their costs would be kept in the bid price for contractors that have an unknown history of or a documented history of delivering products with quality problems. In addition, the contracting officer should have the ability to make a contractor's prior quality performance a weighted factor in determining the award of contracts. This will permit contractors that are new or had problems with quality in the past to still win a contract award and improve their credibility on quality. A change in the Federal Acquisition Regulation is needed to permit this type of contracting officer decision.

Action on Test Results. We provided the results of the laboratory tests and retests to the Logistics Center as the results became available during November 1987 through April 1988. In May 1988, we briefed the results of the audit with the Logistics Center's management and provided details on the National Stock Numbers that were designated as major nonconformances. We provided a similar briefing to the Air Force Logistics Command on June 3, 1988.

The Air Force reviewed the laboratory test results and initiated a testing program in August 1988 to retest parts in 13 National Stock Numbers. Subsequent to our meeting with the Logistics Center in August 1988 to discuss the draft report, the Air Force initiated Material Deficiency Investigations in September and October 1988. The results of the Material Deficiency Investigations are included in Appendix P. Based on the combined results of laboratory tests, the Logistics Center's retests, and the Material Deficiency Investigation Reports, engineers at the Logistics Center determined that the parts in 44 of the 46 National Stock Numbers were usable. Because of the nature of the nonconformances for sample no. 8 and portions of sample no. 5, all the parts were determined to be not usable and were removed from serviceable inventory. From the results of sample no. 8 and sample no. 5, we projected that $12.9 million of Federal Supply Class 1005 (guns through 30 millimeters) was not usable.

The Logistics Center also agreed to initiate Quality Deficiency Reports in September 1988 for nonconforming parts and to provide the reports and the exhibits to the Defense Logistics Agency by October 1988. When there are no other contractual remedies available, the Air Force should also request that contractors provide repairs at no cost to the Government or voluntary refunds for the nonconforming parts, identify how the nonconformances occurred, and report on improvements in quality control practices to prevent future occurrences.

RECOMMENDATIONS FOR CORRECTIVE ACTION

1. We recommend that the Assistant Secretary of Defense (Production and Logistics):

a. Standardize the terminology and definitions for a nonconformance in DoD guidance. Standardization should occur through the use of one set of terms and definitions for a nonconformance, and will eliminate the nonstandard terms and definitions of the words "Nonconformance," "Minor Nonconformance," "Major Nonconformance," "Type I Nonconformance," "Type II Nonconformance," "Defect," "Major Defect," and "Minor Defect" in the Military Standards and bring the terms into agreement with the Federal Acquisition Regulation definitions.

b. Issue a joint Service regulation for the uniform implementation of the nonconformance reduction policies and procedures in Defense Logistics Agency Regulation 8200.10, "Control of Nonconforming Material."

c. Incorporate provisions in draft DoD Directive 5000.XX, "Quality Programs," for:

(1) A program that will use laboratory testing as a tool for verification that spare parts procured against higher level quality requirements for tactical end items conform with certain preidentified technical specifications before the spare parts are accepted. The testing program should emphasize "safety critical" designated parts and the results should be used in the implementation of a DoD-wide product deficiency reporting and feedback system.

(2) A program that will require contract administration offices to follow up on the results of laboratory testing and to reevaluate the quality controls applied to the manufacturing process used to produce the nonconforming parts.

d. Initiate actions to establish provisions within the Federal Acquisition Regulation that permit the contracting officer to include selective testing requirements in Requests for Proposals, to waive the testing requirements in contract bid proposals for contractors with a documented history of producing quality parts, and to make prior quality performance of the contractor a weighted determining factor in the contract award process.

2. We recommend that the Assistant Secretary of the Navy (Shipbuilding and Logistics), the Assistant Secretary of the Air Force (Acquisition), and the Director, Defense Logistics Agency, direct contract administration offices to provide support as requested by procurement offices for in-depth verification of contractor quality control practices for the essential

characteristics of the spare parts in Federal Supply Class 1005 (guns through 30 millimeters) and for audit sample parts referred for review by the Commander, Warner Robins Air Logistics Center. Specifically, quality assurance verification should include reviews of subcontractor supplied material inspection processes, in-plant manufacturing processes, the adequacy of test equipment, and the independence of the contractors' quality control functions.

3. We recommend that the Commander, Air Force Logistics Command:

a. Improve the consolidation of quality performance data on contractors in the Contractor Responsibility Review Program system. Improvements should include the availability of all Quality Deficiency Reports and other current historical data on contractor quality performance to contracting officers during the acquisition process.

b. Establish a coordinated postproduction inspection and testing program to determine the extent of nonconformances in spare parts procured against higher level quality requirements for use on tactical end items. The program should emphasize "safety critical" spare parts, be based on cost-effective feasible testing methodology, and determine the feasibility and type of spare parts to include in acceptance inspections at the destination.

4. We recommend that the Commander, Warner Robins Air Logistics Center:

a. Initiate additional testing and inspection requirements in contracts and provide additional mandatory inspection requirements and essential characteristics of parts to contract administration offices for the acquisition of spare parts from the Federal Supply Class 1005 (guns through 30 millimeters).

b. Provide Quality Deficiency Reports and test results to the cognizant contract administration offices on the nonconformances identified in this audit and in future testing.

c. Request contractors that provided the nonconforming parts identified in this report to provide repairs at no cost to the Government or voluntary refunds for the nonconforming parts, to identify how the nonconformances occurred, and to report on how quality control practices were modified to prevent future occurrences.

MANAGEMENT COMMENTS

The Assistant Secretary of Defense (Production and Logistics), the Assistant Secretary of the Navy (Shipbuilding and Logistics), the Deputy Assistant Secretary of the Air Force (Acquisition Management and Policy), and the Comptroller, Defense Logistics Agency, provided comments on the finding and the recommendations. The complete texts of the comments are in Appendixes L, M, N, and O, respectively. As an attachment to its response, the Air Force provided a 49-page analysis of the results of the Material Deficiency Investigation Reports and the Logistics Center's conclusion for each sample National Stock Number. We did not include the Air Force's attachment in the report. Instead, in Appendix P, we summarized the Air Force's analysis from that attachment and included the summary along with the audit response for each sample number.

Recommendation 1.

The Assistant Secretary of Defense (Production and Logistics) stated that recommendations made to that office have merit and will be properly evaluated by the Department of Defense Quality Assurance Council after the final report is issued.

Recommendation 1. in the draft report was not addressed to the Military Departments. However, the Assistant Secretary of the Navy (Shipbuilding and Logistics) and the Deputy Assistant Secretary of the Air Force (Acquisition Management and Policy), as members of the DoD Quality Assurance Council, responded to the draft report.

Recommendation 1.a.

Navy and Air Force management concurred with the recommendation, stating that they support OSD action to standardize the terminology and definitions listed in the recommendation.

Recommendation 1.b.

Navy management stated that current regulations regarding nonconforming material may require some minor clarifications but are considered generally adequate. Air Force management concurred with the objective of the recommendation. The Air Force will issue a joint Service regulation implementing DoD policy on nonconformance reduction. The estimated completion date is May 31, 1989.

Recommendations 1.c.(1) and 1.c.(2)

Navy management concurred with both recommendations. Air Force management concurred with both recommendations provided that the term "essential spare parts," which was used in the draft report recommendation, is changed to "safety critical items" and that the contract administration office, instead of the contract administration officer, be responsible for follow up on the results of laboratory testing.

Recommendation 1.d.

Navy management nonconcurred with the recommendation as written in the draft audit report. The Navy stated that selective testing requirements should not be determined solely on the number of quality deficiency reports and that other quality related issues should be taken into consideration. Air Force management concurred with the objective of the recommendation. However, the Air Force proposed that instead of selectively defining and waiving tests in requests for proposals, action should be initiated to hold contractors responsible for the quality of their products and to make their performance a consideration for future work.

Recommendation 2.

Navy, Air Force, and Defense Logistics Agency management concurred with the recommendation. The Navy stated that the contract administration officers will be directed to conduct in-depth verification of contractors' and subcontractors' quality control functions. Estimated completion date was January 30, 1989. The Air Force stated that Quality Deficiency Reports were issued on items reported as nonconforming in the draft report. The Defense Logistics Agency stated it will perform comprehensive investigations and analyses of items in Federal Supply Class 1005 (guns through 30 millimeters).

Recommendation 3.a.

Air Force management concurred, stating that changes to quality deficiency reports data and additional analysis of quality deficiency reports are needed before contracts are awarded.

Recommendation 3.b.

Air Force management concurred, provided that the recommendation as written in the draft report was revised to state: "Institute a coordinated program to identify all safety critical applications in aerospace and missile programs, and determine the feasibility and type of items to be included in destination acceptance inspection."

Recommendation 4.a.

Air Force management concurred with the intent of the recommendation, but believed the recommendation should occur as part of the testing programs described in Recommendations 1.c.(1) and 3.b.

Recommendation 4.b.

Air Force management concurred with the recommendation, stating that the Logistics Center had already accomplished this task for the parts with nonconformances identified in the audit and that the procedure will be continued for future testing.

Recommendation 4.c.

Air Force management concurred with the recommendation for those parts where the Air Force agreed that a nonconformance exists, and where the parts were not previously accepted through Material Review Board procedures. Requests for refunds will occur when there are no other contractual remedies available.

Finding

The Assistant Secretary of Defense (Production and Logistics) did not comment on the finding. The Navy comments did not indicate concurrence or nonconcurrence with the finding. The Navy did state that DoD quality assurance initiatives should incorporate quality management concepts in its approach to reduce not only the acceptance of nonconforming products into the Defense Supply System, but also the production of nonconforming products by contractors. The Navy was testing concepts for error prevention instead of error detection and for continuous improvement of quality instead of penalizing poor quality.

The Air Force and Defense Logistics Agency agreed that the finding showed that there was evidence of nonconforming parts entering the Defense Supply System and that this warranted DoD and contractor management attention. The Air Force's and the Defense Logistics Agency's responses had two concerns, which are discussed below.

Statistical Procedures Used. The Defense Logistics Agency was critical of the fact that the sample size of 46 National Stock Numbers was smaller than the original sample size of 186 National Stock Numbers. The Air Force's and the Defense Logistics Agency's responses stated that the sample population was extremely sensitive to a few key National Stock Numbers. Sample no. 8, in Federal Supply Class 1005 (guns through 30 millimeters), represents 83 percent of the sample in the Federal Supply Class, and a nonconformance with sample no. 8 skews the finding for the audit. The Air Force also stated that the statistical procedures used in the draft report were not correct because establishing confidence intervals and extending the test results to the population assume independence within each individual National Stock Number. The Air Force further stated that the test results showed that the independence function is violated because a particular part has the same failure predictably repeated. The Air Force also stated that the method of projecting cost was considered incorrect because the method failed to consider the distribution of cost and the relationship between the sample National Stock Numbers and the National Stock Numbers from which the sample was drawn.

Number of Nonconformances. The Air Force and the Defense Logistics Agency stated that the results of the Material Deficiency Investigation Reports did not substantiate the number of major and minor nonconformances cited in the draft report. The Air Force stated that for the 46 National Stock Numbers in the sample, it determined that 2 were major nonconformances, 10 were minor nonconformances, 6 were conforming, and 28 did not have results available.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

Recommendation 1.

Because the Assistant Secretary of Defense (Production and Logistics) did not provide detailed comments to the recommendations, we request additional comments to the final report.

Recommendation 1.b.

We agree with the Navy's and Air Force's responses and revised our recommendation. As written in the draft report, the recommendation included this statement: "Include specific requirements in the regulation for describing nonconformances, the corrective actions to be taken, and the responsibility of Government quality assurance representatives for determining that contractors initiate effective corrective actions." Because the Navy and Air Force stated that the specific requirements were in existing regulations, we deleted that portion of the recommendation.

Recommendation 1.c.(1)

We agree with the Air Force's comments on part of the recommendation. The Air Force was correct that "safety critical" spare parts should be the first priority of any testing program. The term "safety critical" parts was interpreted to mean those parts whose failure adversely affects the safety of personnel. We believe that the testing program should not be limited only to "safety critical" spare parts, but should include all spare parts procured under higher level quality inspection requirements for Air Force tactical end items. The recommendation originally stated: "A program that will use laboratory testing as a tool for verification that essential spare parts conform with certain preidentified technical specifications before their acceptance and that results will be used in the implementation of a DoD-wide product deficiency reporting and feedback system." We have revised the recommendation to require testing of parts procured against higher level quality requirements for tactical end items with emphasis placed on "safety critical" designated parts.

Recommendation 1.c.(2)

The Air Force's comment on the recommendation is valid. We revised the wording of the draft report recommendation that stated ". . . require contract administration officers." The recommendation now states ". . . require contract administration offices."

Recommendation 1.d.

We agree with the Navy's comment on the recommendation that selective testing requirements should not be determined solely on the number of quality deficiency reports. We also agree with the intent of the Air Force's alternative to the recommendation. The recommendation in the draft report originally provided for contracting officers to ". . . waive the testing requirements in contract bid proposals for contractors with a documented history of producing quality parts or with less than a specified numerical rate of quality deficiency reports issued against them on other contracts for production of parts in the same Federal Supply Class." The Navy stated that other data in addition to quality deficiency reports should be a determining factor. The Air Force stated that contractors should be held responsible for the quality of their products and that their performance should be a consideration for future work. Therefore, we have revised the recommendation to require that a contractor's prior quality performance be a weighted determining factor in the contract award process. The intent of the recommendation is to provide the contracting officer with a tool to use when the ability of the procurement source to produce quality products is relatively uncertain. Implementing the recommendation enhances the Air Force objective to make a contractor's performance a consideration for future contract awards.

Recommendation 2.

As of February 7, 1989, 121 days after our draft report recommendation was formally issued and 300 days after we provided the results of laboratory tests to the Logistics Center, the Air Force reported that the Material Deficiency Investigation Reports were not available for 28 of the 46 National Stock Numbers in the audit sample. Our review of 44 Material Deficiency Investigation Reports by the Navy, Air Force, and Defense Logistics Agency showed that 18 of 44 investigations were incomplete. Our comments regarding each Material Deficiency Investigation Report are included in Appendix P.

Recommendation 3.b.

Based on the Air Force's comments, we revised the recommendation. The recommendation originally provided for the Air Force to ". . . establish a postproduction inspection and testing program to determine the extent of major nonconformances in essential spare parts. The program should initially include Federal Supply Class 1005 (guns through 30 millimeters)." We revised the recommendation to require that a postproduction inspection and test program be based on cost-effective testing methodology that includes all spare parts procured against higher level quality requirements, and to require that "safety critical" spare parts be emphasized.

Our revised recommendation reemphasizes our conviction that the identification of quality problems should also apply to spare parts for tactical end items procured against Military Inspection 45208A, "Inspection System Requirements."

Recommendation 4.a.

We do not agree that the Air Force concurred with the intent of the recommendation because the Air Force would limit the testing program to only "safety critical" spare parts. The intent of the recommendation was to require additional testing and inspections for spare parts in Federal Supply Class 1005 (guns through 30 millimeters). This requirement was based on the high degree of nonconforming material found in the supply class. The restriction of additional testing and inspections to only "safety critical" spare parts could exclude all spare parts in Federal Supply Class 1005. During our review, there were no "safety critical" spare parts included in our audit sample of Federal Supply Class 1005.

Recommendation 4.b.

Although the Air Force concurred with the recommendation, it still needs to complete the action on sample no. 6, Aft Structure Assembly, where an apparent crack was identified in the frame station subpart and reported in a laboratory test.

Finding

We have noted the Air Force's and Defense Logistics Agency's disagreements with the finding. In the following paragraphs, we will address each point identified, and we request the Air Force and Defense Logistics Agency to reconsider their positions.

Number of Nonconformances. We do not agree with the Air Force's and the Defense Logistics Agency's assessments that the audit results substantially overstate the extent of nonconformances. We reviewed the results in the Material

Deficiency Investigation Reports and the additional Air Force retests that were provided to support the contention that the number of reported major and minor nonconformances was overstated. Based on the results of retests, in the final report we changed the classifications to minor nonconformances on 2 of the 10 National Stock Numbers originally classified as major nonconformances (sample nos. 2 and 15). Furthermore, the Air Force's and Defense Logistics Agency's assessments were based primarily on incomplete or inaccurate Material Deficiency Investigation Reports. The most significant adjustments were made to Federal Supply Class 1005 (guns through 30 millimeters). The draft report projected that 98.7 percent of the parts in Federal Supply Class 1005 contained nonconformances to essential and critical specifications. After adjustments for retests, we project that 91.9 percent of the parts in Federal Supply Class 1005 contained nonconformances to essential and critical specifications in contracts. Our statistical projection of the nature of the nonconformances in Federal Supply Class 1005 showed two reasons for a reduction in major nonconformances. First, statistical smoothing, described in Appendix F, was used. Second, the number of National Stock Numbers containing major nonconformances was reduced from eight to six National Stock Numbers. The draft report also showed that 94 percent of the parts in Federal Supply Class 1005 contained major nonconformances. Because of the reduction in major nonconformances and the use of statistical smoothing, our projection was adjusted to 65.4 percent of the parts in Federal Supply Class 1005 that contained major nonconformances.

The principal difference between the number of major nonconformances identified by the Inspector General, DoD, and the Air Force was due to differences in the definitions used to determine a major nonconformance. As the basis for defining a major nonconformance, we used procurement related criteria whereby contracting officers will ordinarily reject nonconforming supplies, as described in the Federal Acquisition Regulation, Part 46.407. The Air Force used a definition that was more applicable to supply operations by determining whether the nonconforming parts were either serviceable or unserviceable. The different definitions are provided in Appendix E. Based on the test results and other available information, the Air Force risks weapon systems failures by classifying all parts in audit sample nos. 17, 18, 19, and 37 as fully serviceable before the parts are formally tested in an operational environment.

Using the summary schedule shown on page 4 of the Air Force's comments in Appendix N and after analyzing the Logistics Center retests and Material Deficiency Investigation Reports (MDIR) finding, we added another column to reflect our final report position.

	IG, DoD Draft Report	IG, DoD Final Report	Logistics Center Report	MDIR Report
Major nonconformance	10	8	2	1
Minor nonconformance (only)	31	31	10	8
Fully conforming	4	6	6	22
Results unavailable	1	1	28	15
Total	46	46	46	46

We agree with the Logistics Center's summary conclusions on 10 National Stock Numbers (sample nos. 2, 4, 5, 8, 10, 13, 15, 30, 31, and 86), and we agreed with the MDIR conclusions on 15 National Stock Numbers (sample nos. 2, 3, 4, 5, 10, 12, 15, 16, 30, 32, 37, 39, 83, 87, and VS-7). We disagreed with 36 of the Logistics Center's summary conclusions for four reasons. First, the Logistics Center's findings were unsupported for 11 National Stock Numbers (sample nos. 3, 12, 16, 32, 36, 39, 83, 87, 89, VS-3, and VS-7). Second, the MDIR findings were incomplete because the samples were lost, the wrong test was performed, or actions were not completed for 14 National Stock Numbers (sample nos. 6, 11, 14, 33, 34, 35, 38, 81, 82, 84, 85, 88, VS-2, and VS-5). Third, the MDIR findings were inaccurate for 7 National Stock Numbers (sample nos. 7, 9, 18, 80, VS-1, VS-4, and VS-6). Fourth, the Logistics Center and the Defense Logistics Agency used inappropriate definitions to describe parts that were major nonconformances for 4 National Stock Numbers (sample nos. 1, 17, 19, and 37).

Detailed audit responses to the MDIR's and the Logistics Center's findings are included in detail for each sample number in Appendix P.

Statistical Procedures Used. We agree with the Air Force's and the Defense Logistics Agency comments that the quantity of parts for sample no. 8 had too much effect on the overall statistical projection of Federal Supply Class 1005. The projection to all National Stock Numbers in Federal Supply Class 1005 required statistical smoothing to reduce the quantity effect of sample no. 8. We used a statistical average smoothing procedure for projecting both the number of nonconformances and the dollar value of the nonconformances in Federal Supply Class 1005. Additional details on statistical smoothing are in Appendix F.

We explained the need to reduce the sample size to 46 National Stock Numbers in the "Objectives and Scope" section of the report. The reduction in no way affected the validity of statistical projections in the three Federal Supply Classes included in the audit.

We disagree with the Air Force's comment concerning the independence of individual nonconformances within each National Stock Number. The test results clearly showed that most National Stock Numbers in Federal Supply Class 1005 had a variety of nonconformances applicable to multiple parts, and the samples within those 19 National Stock Numbers adequately represented the number of stocked items in those National Stock Numbers. Also, the statistical smoothing of the effect of sample no. 8's quantity addresses the Air Force's concern about the cost distribution between audit sample National Stock Numbers and the National Stock Numbers from which the audit sample was drawn.

DOD INITIATIVES TO IMPROVE QUALITY

Recognizing that the quality reputation of U.S. goods and services has diminished and DoD's ability to perform its mission depends on quality products and services, DoD implemented several initiatives to improve quality. First, in January 1987, the Office of the Assistant Secretary of Defense (Production and Logistics) formulated a DoD Total Quality Management Strategy with the objective of achieving continuous improvement in quality. Through the application of the Total Quality Management Strategy concept, DoD expects to effect a cultural change from defect correction to defect prevention, from quality "inspected" into products to quality designed and built into the process and product, and from acceptable levels of defects to continuous process improvement. DoD also expects to evolve from the lowest procurement cost to the optimum life-cycle cost and from emphasis on cost and schedule to emphasis on quality, cost, and schedule. DoD Directive 5000.XX, "Total Quality Management," is a new directive that will implement the new guidance.

The programs pursued through the Total Quality Management Strategy are developed through the coordinated efforts of the DoD Quality Assurance Council. In FY's 1987 and 1988 the Council started four initiatives.

One of the initiatives to improve quality came about when the Secretary of Defense highlighted an urgent need to address the problem of counterfeit material entering the DoD supply system. The substitution of inferior material in grade 8 bolts has been linked to significant equipment failures. An Inspector General, DoD, Defense Criminal Investigative Service study, IGSDY 5505.25, "Product Substitution Fraud," May 1988, stated that 15 percent of the 367 cases pursued involved substitution of commodities that could have an adverse effect on force readiness or the safety of personnel. As a result, the Office of the Assistant Secretary of Defense (Production and Logistics) has developed and will continue to monitor the action plan addressing counterfeit material and unauthorized product substitution. The action plan includes a range of corrective and preventive actions to accomplish the purging of material that was counterfeited, altered, or substituted without authorization, and was already in the DoD supply system. Furthermore, the plan will institutionalize methods of procurement and information feedback to prevent such material from entering the DoD supply system in the future.

The DoD Quality Assurance Council Working Group (the Working Group) to Improve the Quality Deficiency Reporting process developed a program plan that addressed five tasks the Working Group identified as common problems.

- Task number one of the program plan is to standardize and improve timeliness and effectiveness of the deficiency reporting process. Audits, inspections, and studies within the Services and DoD have identified a need for more and better reporting of quality deficiencies by users, for decreasing administrative delays, for improving screening points, for processing procedures, for narrowing the scope on how deficiency data are used to reflect trends, and for preventing users from receiving nonconforming material.

- Task number two addressed by the Working Group is exhibit control and disposition. An exhibit is a nonconforming or potentially defective product. Many exhibits required for deficiency investigations are repaired or returned to service at the organization point to maintain a required readiness level. In other instances, valid Quality Deficiency Reports do not result in screening and identifying additional defective material in the supply system.

- Task number three is to improve the design and corrective action process. DoD Components are procuring, manufacturing, and maintaining products and services that do not meet desirable quality levels. The existing DoD Quality Deficiency Report process does not address design and procurement deficiencies. Accordingly, implementation of proper corrective action does not occur. This has resulted in users receiving unsuitable material, limited mission capability, low operational effectiveness, and conflicts or confusion between various Quality Deficiency Report processing points.

- Task number four is to establish data exchange between DoD Components. There is no integrated automated system between the DoD Components to facilitate the exchange of Quality Deficiency Report information or to track contractor quality history information.

- Task number five is to establish a requirement for contractor participation in the Quality Deficiency Report process. There is no contractual requirement for contractors to investigate defects and take appropriate corrective actions. Some contractors have refused to perform investigations on Quality Deficiency Reports. A Defense Federal Acquisition Regulation case was scheduled for presentation during the fourth quarter of FY 1988 for inclusion of a proposed contract clause in DoD Federal Acquisition Regulation Supplement, Part 52.246, to require investigations.

A third Total Quality Management initiative is a joint Service regulation under development to uniformly implement the intent of Defense Logistics Agency Regulation 8200.10, "Control

DOD INITIATIVES TO IMPROVE QUALITY (Continued)

of Nonconforming Products," June 8, 1987. The joint Service regulation will provide policy guidance for controlling minor nonconformances identified at contractor facilities and approved for use by Material Review Boards. (A Material Review Board consists of contractor personnel who recommend to the Government disposition of nonconforming material.) The regulation will require that the administrative contracting officer negotiate an agreement with the contractor that specifies an acceptable level of quality performance. Government personnel will monitor contractor quality and if the contractor does not exhibit an acceptable level of quality performance, an equitable price reduction to the contract will occur. Imposition of monetary consideration will encourage contractors to evaluate thoroughly the root causes of nonconformances and to institute effective corrective action to prevent recurrence. Thus, fewer nonconformances will occur and increased quality will result. A planned date for issuance of the regulation has not yet been established. An Air Force draft version of this regulation does not include specific requirements for describing nonconformances, the corrective actions to be taken, and the responsibility of Government quality assurance representatives for determining that contractors initiate effective corrective actions.

A fourth Total Quality Management initiative is the revision and development of policy and guidance relative to quality. This initiative addresses the need for uniformity and definition of a single set of Total Quality Management policies and procedures that reflect clearly defined goals, objectives, elements, scope, and application. Included in this initiative is the development of a new DoD directive on Total Quality Management and the revision of an existing DoD directive on Quality Programs. The drafts for both directives are expected to be circulated for comment during FY 1989.

In addition to the Total Quality Program initiatives, the Air Force has initiated two programs to assist the procurement contracting officer in making quality a consideration in the award process. The Competition for Performance Program (the Blue Ribbon Committee, Policy Letter No. 87-31, November 30, 1987) formalizes the authority of contracting officers to exercise business judgment in awarding contracts. The program allows the contracting officer the latitude to make an award to the offeror who provides the "greatest value" to the Government. Under this program, the contracting officer will consider not only price but also quality and other factors in arriving at an award decision. Based on demonstrated quality and delivery performance, the contracting officer may award a contract to an offeror at a price up to 10 percent higher than the lowest offeror, or up to 20 percent higher if approved by the Director or Deputy Director of Contracting.

DOD INITIATIVES TO IMPROVE QUALITY (Continued)

The Contractor Responsibility Review Program (Air Force Logistics Command Regulation 84-2, January 28, 1987) is a program that establishes responsibilities and procedures for operating a program of overall contractor responsibility. This regulation was initiated in accordance with the Federal Acquisition Regulation, Subpart 9-105.1, and requires that records and performance data about the ability of contractors to perform successfully on Government contracts be kept and used in placing new acquisitions. This program of continuous review and evaluation of contractor responsibility has two basic purposes. First, it gives a centralized point at each contracting activity for the collection of performance data to determine the responsibility of prospective contractors. Second, it provides a system to identify and report problem contractors and encourages the contractors to start corrective action.

ORIGINAL RANDOM SAMPLE OF FEDERAL SUPPLY CLASSES SELECTED FOR REVIEW AT WARNER ROBINS AIR LOGISTICS CENTER

Federal Supply Class	Nomenclature	Number of NSN's 1/ to be Reviewed
1005	Guns through 30 millimeters	19
1420	Guided missile components	10
3130	Bearings, mounted	10
3930	Warehouse trucks, tractors, self-propelled	10
4240	Safety rescue equipment	10
4310	Compressor and vacuum pumps	10
4730	Fittings -- hoses, pipes, tubes	10
5120	Hand tools, nonedged, nonpowered	10
5962	Microcircuits -- electronic	19
5970	Electric insulators and insulating material	10
5975	Electric hardware and supplies	10
5995	Cable, cord, and wire assemblies -- communication equipment	19
7025	ADP 2/ input/output and storage devices	25
7530	Stationery, records, forms	6
7690	Miscellaneous printed matter	2
9905	Signs advertising, displays, identification plates	6
Total		186

1/ NSN -- National Stock Number

2/ ADP -- Automated Data Processing

WARNER ROBINS AIR LOGISTICS CENTER
UNIVERSE AND SAMPLE,
FEDERAL SUPPLY CLASSES SELECTED FOR TESTING

Sample Number 1 -- FSC's 1/ Selected from Original Sample for Audit

		Sample			Universe		
FSC	Nomenclature	Number of NSN's 2/	Units Sampled	Value of Units	Number of NSN's	Number of Units	Value of Units
1005	Guns Through 30mm 3/	19	307	$112,986	1,552	647,922	$110,403,994
3130	Mounted Bearings	10	235	47,526	19	2,409	395,678
5120	Hand Tools	10	100	7,350	638	23,003	1,604,239
	Subtotals	39	642	$167,862	2,209	673,334	$112,403,911

Sample Number 2 -- Air Force Hardware Items

		Sample			Universe		
FSC	Nomenclature	Number of NSN's	Units Sampled	Value of Units	Number of NSN's	Number of Units	Value of Units
5306	Bolt	1	80	$ 1,999	1	766	$ 19,142
5306	Screw	1	50	92	1	500	920
5306	Bolt	1	32	81	1	240	610
5307	Stud	1	13	375	1	44	1,268
5307	Stud Extension	1	80	185	1	8,918	20,601
5310	Washer Insulator Resistor	1	80	36	1	1,695	763
5315	Pin, Retainer Ring	1	50	31	1	428	265
	Subtotals	7	385	$ 2,799	7	12,591	$ 43,569
	Grand Totals	46	1,027	$170,661	2,216	685,925	$112,447,480

1/ FSC -- Federal Supply Class

2/ NSN -- National Stock Number

3/ mm -- millimeters

SYNOPSES OF PRIOR AUDIT REPORTS ON DOD QUALITY ASSURANCE ISSUES AND DEFECTIVE PARTS

Office of the Inspector General, DoD, Report No. 84-018, "Procurement Quality Assurance of Material Receipts by Corpus Christi, Texas, Army Depot," December 7, 1983. The objective of this audit was to determine the causes for defective material being received at the Corpus Christi Army Depot. The review showed that $3 million of one manufacturer's defective parts had been shipped to Corpus Christi between October 1981 and March 1983. This condition occurred due to inadequate manufacturer quality control and less than effective enforcement of quality assurance procedures by DoD officials. The report recommended that the DoD quality assurance office at the contractor's plant intensify its effort to monitor contractor's quality. The Corpus Christi Army Depot agreed to follow established reporting requirements, and the Army expanded its sources for engines and engine parts. Both the Army and the Defense Logistics Agency concurred with the report and recommendations. Long-range quality assurance programs were installed at AVCO Lycoming, and some improvements were noted as of November 1985.

Office of the Inspector General, DoD, Report No. 85-054, "Defective Parts on the Navy's Light Airborne Multi-Purpose System MK III Program," December 17, 1984. The report stated that new parts received from several manufacturers under the Navy Light Airborne Multi-Purpose System MK III Program were defective upon their arrival at the System prime contractor and Navy field unit sites. The Naval Air Systems Command directed repairs of these defective parts at Government expense instead of determining the cause of the defects and whether the source manufacturers should repair the items at their own expense. The cost of these repairs from August 1982 to August 1984 was estimated at $2 million ($1 million annually). The report recommended that the Defense Logistics Agency initiate a quality assurance review to determine compliance with prescribed quality assurance regulations. A second recommendation was directed to the Navy to ensure that the Government does not pay for the repair of defective new parts when correction of the defects rests with the supplier. Both the Navy and the Defense Logistics Agency concurred with the report and are taking action to enforce the quality deficiency reporting system.

Office of the Inspector General, DoD, Report No. 86-131, "Processing of Quality Deficiency Reports in the Defense Logistics Agency," August 28, 1986. The objective of this audit was to determine whether quality deficiency reports were properly prepared and processed for defective goods received from contractors. This report concluded that 57 percent of quality deficiency reports sent to two Defense Contract Administration Services Regions contained information that was not accurate, proper, or sufficient to determine the cause of the reporting

provided

SYNOPSES OF PRIOR AUDIT REPORTS ON DOD QUALITY ASSURANCE ISSUES AND DEFECTIVE PARTS
(Continued)

deficiency. The report recommended that a joint directive be revised to require that quality deficiency reports are provided to screening points either with the defective item and test data or with sufficient information to support the stated deficiency. Also recommended was the establishment of procedures that require thorough screening of quality deficiency reports before the reports are forwarded for investigation. The Defense Logistics Agency expressed only general concurrence with the findings and nonconcurred with some of the recommendations. The Office of the Secretary of Defense (Acquisition and Logistics), however, concurred with the report and indicated that action would be taken through the DoD Quality Assurance Council to address the recommendations.

General Accounting Office Report No. NSIAD-87-33 (OSD Case No. 7180), "Quality Assurance Efforts to Strengthen DoD's Program," November 3, 1986. This report stated that documentation by the Services and the Defense Logistics Agency showed that the current DoD In-Plant Quality Assurance Program is not as effective as it should be in ensuring delivery of quality products. Government Quality Assurance Representative Offices did not implement Federal Acquisition Regulation requirements pertaining to verification of quality conformance to contract specifications. Also, the Representative Offices did not discourage the repeated submission of minor nonconforming material or even have a system to identify recurring quality problems. Some Plant Representative Offices had agreements to delegate Government inspections to contractors and did not perform mandatory Government inspections. Also, hiring and retention of quality assurance staff was a problem. While the Services and the Defense Logistics Agency are attempting to correct the problems, there is no comprehensive plan for improving in-plant quality assurance DoD-wide. DoD's policy of uniform implementation of quality programs needs to be implemented. The report recommended that the Secretary of Defense instruct the Quality Assurance Council to facilitate the interchange of ideas between the Services and the Defense Logistics Agency and to prepare and carry out a long-range plan for developing and implementing a DoD-wide optimum quality assurance plan. The DoD found the General Accounting Office observations consistent with DoD internal evaluations that have prompted the recent undertaking of various initiatives to improve quality.

Office of the Inspector General, DoD, Report No. 87-083, "Follow-on Audit of Known But Unreported Defective Material," February 11, 1987. The objective of this follow-on audit was to determine how widespread within DoD was the practice of not

SYNOPSES OF PRIOR AUDIT REPORTS ON DOD QUALITY ASSURANCE ISSUES AND DEFECTIVE PARTS

(Continued)

reporting items known to be defective. The report followed Office of the Inspector General Report No. 86-131, "Processing of Quality Deficiency Reports in the Defense Logistics Agency." The follow-on report concluded that the number of known defective items not reported was relatively small, as was the additional dollar amount the Government spent to repair the defects. The report recommended that the Army and Navy reemphasize the need to prepare quality deficiency reports on defective items. Also, it was recommended that the National Security Agency require key Components to provide feedback on unsatisfactory quality conditions and to prepare quality deficiency reports when items are found to be defective. The Army, Navy, and National Security Agency concurred with their respective findings and recommendations, and stated that corrective actions had been undertaken.

General Accounting Office Report No. NSIAD-B230506 (OSD Case No. 7585), "Quality Assurance Procedures for Fiber Optic Cables Used by DoD," March 31, 1988. This report stated that the Air Force experienced problems with broken fiber optic cables for over 3 years. During this period, the Tactical Air Command noted 16 cable failures; however, the Air Force Quality Deficiency Reporting System reported only 2 cases. Both cases were reported in 1986 and both were determined to be isolated cases. No more Quality Deficiency Reports were filed in 1987 or 1988. No recommendations were included in the audit report, but the Air Force initiated actions to perform additional testing on the cables and salvage cables that previously were to be discarded.

General Accounting Office Report No. NSIAD-88-104 (OSD Case No. 7451), "Quality Assurance - Concerns About Four Navy Missile Systems," March 24, 1988. The objective of this report was to evaluate quality assurance issues on the Phoenix, the High-Speed Anti-Radiation Missile, the Harpoon, and the Sparrow missile systems. Emphasis was placed on the extent, seriousness, cause, and the effects of quality problems in the production of the missiles. Emphasis was also placed on the structure of the DoD and contractor quality assurance organizations. In part, the General Accounting Office concluded that all four missile systems failed in one respect or another to conform with contract specifications. Some discrepancies occurred due to inadequate manufacturing processes at the prime contractor, while several of the more significant problems were caused by poor manufacturing and inadequate quality oversight at subcontractors. No recommendations were included in the report.

SYNOPSES OF PRIOR AUDIT REPORTS ON DOD QUALITY ASSURANCE ISSUES AND DEFECTIVE PARTS
(Continued)

General Accounting Office Report No. NSIAD-29-28FS (OSD Case No. 7767), "Procurement - Department of Defense Quality Assurance Efforts," November 2, 1988. This fact sheet was prepared at the request of the Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives. The fact sheet stated that DoD, the Services, and the Defense Logistics Agency did not have enough data to reliably estimate the total amount of or the value of nonconforming material that may be in their inventories. However, based on samples taken, DoD quality assurance officials believed that the items in the DoD inventory were of high quality. DoD's Quality Deficiency Reporting System was designed to initiate corrective actions where nonconformances are discovered, usually by users, after the Government has accepted the item. However, DoD studies have shown that the Quality Deficiency Reporting System is not always a reliable means of identifying nonconforming goods and problem contractors because of problems such as the lack of DoD-wide data systems to track contractors' quality history or to help exchange information between DoD procurement activities. There is no DoD-wide contractor history system primarily because the Services and the Defense Logistics Agency are unable to agree on how the data in a DoD-wide system should be compiled and maintained. No recommendations were included in the fact sheet.

GUIDANCE AND DEFINITIONS FOR NONCONFORMANCES AND OTHER RELATED QUALITY ASSURANCE TERMS

Nonconforming Supplies: the Federal Acquisition Regulation, Part 46.407, "Government Contract Quality Assurance - Nonconforming Supplies or Services," provides the following guidance and definitions on nonconforming supplies.

> (a) Contracting officers should reject supplies or services not conforming in all respects to contract requirements.
>
> (b) Contractors ordinarily shall be given an opportunity to correct or replace nonconforming supplies or services when this can be accomplished within the required delivery schedule.
>
> (c) The contracting officer shall ordinarily reject supplies or services when the nonconformance adversely affects safety, health, reliability, durability, performance, interchangeability of parts or assemblies, or any other basic objective of the specification.
>
> (d) If the nonconformance is minor, in that it does not affect any of the factors referred to in (c) above, the cognizant contract administration office may make the determination to accept or reject . . . .

Nonconformance: the failure of a characteristic to conform to the requirements specified in the contract, drawings, specifications, or other approved product description (Military Standard 1520C, "Corrective Action and Disposition System for Nonconforming Material").

Minor Nonconformance: a discrepancy that does not adversely affect health or safety; performance; interchangeability, reliability, or maintainability; effective use or operation; or weight and appearance. Multiple minor nonconformances, when considered collectively, may raise the category to a major/critical nonconformance (Military Standard 1520C).

Major Nonconformance: a nonconformance other than minor that cannot be completely eliminated by rework or reduced to a minor nonconformance by repair. When a classification of defects exists, minor defects are minor nonconformances. Major and critical defects that cannot be completely eliminated by rework or reduced to a minor nonconformance by repair are major/critical nonconformances (Military Standard 1520C).

GUIDANCE AND DEFINITIONS FOR NONCONFORMANCES AND OTHER RELATED QUALITY ASSURANCE TERMS

(Continued)

Type I Nonconformance: ordinarily rejected by the contracting officer because it adversely affects safety, health, durability, performance, interchangeability of parts, or effective use or operation (Defense Logistics Agency Regulation 8200.10, "Control of Nonconforming Material").

Type II Nonconformance: minor because it does not affect any of the reasons in Type I for ordinary rejection (Defense Logistics Agency Regulation 8200.10).

Defect: any nonconformance of a characteristic with specified requirements (Military Standard 109B, "Quality Assurance Terms and Definitions").

Minor Defect: a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit (Military Standard 109B).

Major Defect: a defect other than critical that is likely to result in failure or to reduce materially the usability of the unit of product for its intended purpose (Military Standard 109B).

Material Deficiency: any unsatisfactory condition (for example, physical, chemical, software, firmware, electrical, functional) noted in material that is attributable to nonconformance to contractual or specification requirements. Substandard workmanship and manufacturing defects will be considered to fall within this definition provided the standard against which the work has been judged is identified (Defense Logistics Agency Regulation 4155.24, "Reporting of Product Quality Deficiencies Across Component Lines").

Category I Deficiency: a product quality deficiency that may cause death, injury, or severe occupational illness; that would cause loss or major damage to a weapon system; that directly restricts the combat readiness capabilities of the using organization; or that would result in a production line stoppage (Defense Logistics Agency Regulation 4155.24).

Category II Deficiency: a product quality deficiency that does not meet the criteria set forth in category I (Defense Logistics Agency Regulation 4155.24).

GUIDANCE AND DEFINITIONS FOR NONCONFORMANCES AND OTHER RELATED QUALITY ASSURANCE TERMS
(Continued)

Serviceable (condition code "A" material, issuable without qualification): new, used, repaired, or reconditioned material that is serviceable and issuable to all customers without limitation or restriction. This includes material with more than 6 months shelf-life remaining (Air Force Manual 67-1, "Air Force Supply Manual").

Serviceable (condition code "B" material, issuable with qualification): new, used, repaired, or reconditioned material that is serviceable and issuable for its intended purpose but that is restricted from issue to specific units, activities, or geographical areas by reason of its limited usefulness or short service life expectancy. This includes material with a shelf-life remaining of 3 to 6 months (Air Force Manual 67-1).

Serviceable (condition code "C" material, priority issue): items that are serviceable and issuable to selected customers but must be issued before condition codes "A" and "B" material to avoid loss as a usable asset. This includes material with less than 3 months shelf-life remaining (Air Force Manual 67-1).

Serviceable (condition code "D" material, test and modification): serviceable material that requires test, alteration, modification, conversion, or disassembly. This does not include items that must be inspected or tested immediately before issue (Air Force Manual 67-1).

Unserviceable (condition code "E" material, limited restoration): material that involves only limited expense or effort to restore to serviceable condition and that is accomplished in the storage activity where the material is located. This material may be issued to support ammunition requisitions coded to indicate acceptability of usable condition code "E" material (Air Force Manual 67-1).

Unserviceable (condition code "F" material, repairable): economically repairable material that requires repair, overhaul, or reconditioning (includes repairable items that are radioactively contaminated) (Air Force Manual 67-1).

Unserviceable (condition code "G" material, incomplete): material requiring additional parts or components to complete the end item before issue (Air Force Manual 67-1).

Unserviceable (condition code "H" material, condemned): material that has been determined to be unserviceable and does not meet repair criteria, condemned items that are radioactively contaminated, and type I shelf-life material that has passed the expiration date and cannot be extended (Air Force Manual 67-1).

STATISTICAL SAMPLING PLAN AND METHODOLOGY

Sampling Plan

The three Federal Supply Classes (FSC's) within the Hardware Federal Supply Groups (FSG's) were selected in agreement with the Air Force Logistics Command.

The National Stock Numbers (NSN's) within the FSC's were selected using random sampling techniques. The number of NSN's chosen per FSC was determined by the requirement to project the results of the sample to the entire supply class with adequate confidence and precision. The results are as follows:

FSC	Universe Number of NSN's in Supply Class	Sample Number of NSN's Selected from Supply Class
1005	1,552	19
3130	19	10
5120	638	10

Based on the number of NSN's selected, we planned to estimate the proportion of defective parts within ± 9 percent and with 90-percent confidence.

The number of units selected per NSN for physical testing was based on criteria provided in Military Standard 105D, "Sampling Procedures and Tables for Inspection by Attributes." The units selected were randomly drawn from the inventory. The number of units actually tested was based on the number of units drawn from each contract. Generally, 5 to 10 units were tested for each contract containing quantities greater than 20 items. Independent laboratories randomly selected the items for testing.

In addition to the previously described methodology, a decision was made within the Office of the Inspector General, DoD, to pick seven additional NSN's related to "fasteners." These types of hardware items had been the subject of past criminal investigation proceedings concerning counterfeit parts. It was decided to check the stock at Warner Robins Air Logistics Center (the Logistics Center) to determine if the hardware items procured by the Logistics Center were subject to product substitution problems. No attempt was made to project test results to the entire Federal Supply Group containing these parts. Instead, we used sample test results to project only to the specific NSN being tested and only to the stock of this NSN at the Logistics Center. The NSN's selected had some of the highest on-hand balances of hardware items that the Logistics Center procured. Most hardware items stored at the Logistics Center are procured by the Defense Logistics Agency.

Statistical Methodology

Calculations

Point Projections based on clusters (NSN's) within FSC's:

$$\text{Projected number of occurrences} = \left(\frac{\text{Sample number of occurrences}}{\text{Sample Size}}\right) \text{ X } (\text{Universe size})$$

$$\text{Projected Value of occurrences} = \left(\frac{\text{Sample value of occurrences}}{\text{Sample value overall}}\right) \text{ X } (\text{Universe value overall})$$

Note that these formulas are self weighting. Therefore, the results are weighted results and require weighted standard error estimates. The formulas for measuring standard errors and figures for margin of error (precision) with 90-percent confidence are as follows.

$$\text{Margin of Error for Number of Occurrences} = Nt\sqrt{\frac{\sum_i W_i \left(p_i - \bar{p}_{clus}\right)^2}{c(c-1)}\left(\frac{C - c}{C - 1}\right)}$$

$$\text{Margin of Error for Value of Occurrences} = Nt\sqrt{\frac{\sum_i W_i \left(\bar{x}_i - \bar{x}_{clus}\right)^2}{c(c-1)}\left(\frac{C - c}{C - 1}\right)}$$

Where: N = number of items in the universe of FSC's
C = number of clusters (NSN's) in an FSC universe
c = number of clusters (NSN's) sampled from an FSC
W_i = appropriate universe weights
t = confidence coefficient for 90-percent confidence
p_i = proportion with major nonconformances in an NSN sample
$\bar{p}_{clus}$ = average proportion with major nonconformances across all clusters (NSN's) within the FSC
$\bar{x}_i$ = average value of major nonconformances in an NSN sample
$\bar{x}_{clus}$ = average of all the average values of nonconformance across all clusters (NSN's) within the FSC

STATISTICAL SAMPLING PLAN AND METHODOLOGY
(Continued)

Using the above formulas, we produced the following results for major nonconformances.

Federal Supply Class	Projected Number	Margin of Error 1/	Projected Amount	Margin of Error 1/
1005	423,741 2/	± 13,560 (± 3.2%)	$14,400,000 3/	± $1,500,000 (± 10.2%)
3130	737 4/	± 103 (± 14.0%)	$136,500 5/	± $10,600 (± 7.8%)
5120	0	0	0	0

1/ Assumes 90-percent confidence

2/ See Appendix H, page 2 -- Statistical Projections of Test Results by Parts

3/ See Appendix H, page 7 -- Statistical Projections of Test Results by Dollar Value

4/ See Appendix H, page 3 -- Statistical Projections of Test Results by Parts

5/ See Appendix H, page 8 -- Statistical Projections of Test Results by Dollar Value

Projection of Statistical Sample

In the draft report, we projected the number of nonconformances without adjusting for any NSN's that might unduly affect the overall distribution of occurrences. The projections in the draft report for Federal Supply Class 1005 (guns through 30 millimeters) were affected by NSN 1005-00-056-5837, retainer partition (sample no. 8). This NSN accounted for about 83 percent of the parts and 37 percent of the dollar value of the sample universe in Federal Supply Class 1005. None of the other 45 National Stock Numbers in the audit sample had a similar effect on the projections.

STATISTICAL SAMPLING PLAN AND METHODOLOGY
(Continued)

To adjust the statistical projections for sample no. 8, a mathematical smoothing method was used to eliminate the heavy self-weighting effect of the one NSN. The smoothing approach eliminated the unrepresentative statistical characteristics of sample no. 8 on the remaining NSN's in the audit sample. Mathematically, this was accomplished by removing sample no. 8 from the other 19 sample items. An average number of major nonconformances and an average value of major nonconformances were computed for the remaining 18 sample items. Sample no. 8 was then inserted back into the sample and the effect of sample no. 8 was weighted at the same average level as the other 18 items. The smoothing method and the reduction of major nonconformances from eight NSN's to six NSN's in Federal Supply Class 1005 caused a reduction in the number of major nonconforming parts and in the value of the major nonconforming parts. The percentage of major nonconforming parts decreased from 94 percent shown in the draft report to 65.4 percent. The percentage of the value of the major nonconforming parts in the audit universe decreased from 44 percent shown in the draft report to 13 percent of the Federal Supply Class universe value of $110.4 million.

A comparison of the revised projections for the final report for Federal Supply Class 1005 to the projections provided in the draft report are provided below, and the revised projections are included in Appendix H.

STATISTICAL SAMPLING PLAN AND METHODOLOGY
(Continued)

Comparison of Point Estimates of Draft Report to Final Report

Statistical Projections of Test Results
By Number of Parts and Dollar Value (Thousands)
Draft Report

Test Result Point Estimates

Federal Supply Class	Universe		Conforming		Major Nonconformance		Minor Nonconformance		Undetermined	
	NSN's	Parts	Percent	Parts	Percent	Parts	Percent	Parts	Percent	Parts
1005	1,552	647,922	1.3	8,423	94.0	609,047	4.7	30,452	0	0
	1,552	$110,400 1/	6.7	$7,400 1/	44.0	$48,600 1/	49.3	$54,400 1/	0	$0

Statistical Projections of Test Results
By Number of Parts and Dollar Value (Thousands)
Final Report

Test Result Point Estimates

Federal Supply Class	Universe		Conforming		Major Nonconformance		Minor Nonconformance		Undetermined	
	NSN's	Parts	Percent	Parts	Percent	Parts	Percent	Parts	Percent	Parts
1005	1,552	647,922	8.1	52,482	65.4	423,741	26.5	171,699	0	0
	1,552	$110,404 1/	5.9	$6,514 1/	13.0	$14,352 1/	81.1	$89,538 1/	0	$0

1/ The dollar value of the parts is expressed in thousands.

RESULTS OF TESTING BY FEDERAL SUPPLY CLASS

FEDERAL SUPPLY CLASS 1005 -- GUNS THROUGH 30 MILLIMETERS

Sample Number	NSN 1/	Nomenclature	Number Tested	Number Conforming	Number Nonconforming Major	Number Nonconforming Minor	Contract Number	Quality Assurance Representative
1	1005-01-120-2279	Track, fixed forward	1	0	1	0	F09603-82-G-2056-1230	DCASPRO-Burlington, VT 2/
			10	0	10	0	F09603-82-G-2056-0102	DCASPRO-Burlington, VT
			2	0	0	2	F09603-82-G-2056-0066	DCASPRO-Burlington, VT
2	1005-00-739-4190	Gear spacer	2	0	0	2	F09603-85-M-4996	DCASMA-Boston, MA 3/
3	1005-01-121-3716	Transfer unit 4/	1	0	0	1	F09603-82-G-2056-0102	DCASPRO-Burlington, VT
			1	0	0	1	F09603-85-C-3546	DCASPRO-Burlington, VT
			1	0	0	1	F08635-83-C-0051	DCASPRO-Burlington, VT
4	1005-00-213-7822	Gun end	7	7	0	0	F09603-84-G-1448-0022	DCASMA-St. Paul, MN
			6	6	0	0	F09603-84-G-1448-0026	DCASMA-St. Paul, MN
5	1005-00-893-8231	Scoop shaft assembly	2	0	2	0	F09603-84-C-4550	DCASMA-Orlando, FL
			11	0	1	10	F09603-85-M-4935	DCASMA-Van Nuys, CA
6	1005-01-130-6812	Aft structure assembly	2	0	0	2	F09603-82-G-2056-0066	DCASPRO-Burlington, VT
7	1005-00-276-7831	Sprocket assembly	5	0	0	5	F09603-82-G-2056-1088	DCASPRO-Burlington, VT
8	1005-00-056-5837	Retainer partition	5	0	5	0	F09603-84-C-3627	DCASMA-New York, NY
			5	0	[illegible]	0	F09603-85-C-4189	DCASMA-Reading, PA
9	1005-00-275-5798	Shaft shoulder	4	2	0	2	F09603-82-G-2056-1249	DCASPRO-Burlington, VT
			4	2	0	2	F09603-85-C-4100	DCASMA-Santa Ana, CA
10	1005-00-116-4703	Rod, extension	5	5	0	0	F09603-84-G-1490-0028	DCASMA-Birmingham, AL

See footnotes at end of table.

RESULTS OF TESTING BY FEDERAL SUPPLY CLASS (Continued)

FEDERAL SUPPLY CLASS 1005 -- GUNS THROUGH 30 MILLIMETERS

Sample Number	NSN	Nomenclature	Number Tested	Number Conforming	Number Nonconforming Major	Number Nonconforming Minor	Contract Number	Quality Assurance Representative
11	1005-00-921-5120	Shaft	5	2	0	3	F09603-85-M-4914	DCASMA-Syracuse, NY
12	1005-00-100-4106	Coil assembly	3	3	0	0	F09603-82-G-2056-0081	DCASPRO-Burlington, VT
13	1005-00-928-5189	Link, loader mounting	5	0	0	5	F09603-85-M-5165	DCASMA-Inglewood, CA
14	1005-00-050-1979	Modular assembly, feed	2	0	0	2	F09603-85-M-4439	DCASMA-Springfield, NJ
15	1005-00-383-1102	Support assembly	2	0	0	2	N00383-83-G-3500-RJGP	NAVPRO-St. Louis, MO [5]
16	1005-01-125-5229	Shaft shouldered	12	0	0	12	F09603-82-G-2056-0102	DCASPRO-Burlington, VT
			1	0	0	1	F09603-82-G-2056-0005	DCASPRO-Burlington, VT
17	1005-00-923-9719	Cover	5	0	5	0	F34601-85-G-0031-RJ06	DCASMA-Wichita, KS
			7	0	7	0	F34601-85-G-0031-RJ73	DCASMA-Wichita, KS
			1	0	1	0	F34601-83-G-1755-RJA2	DCASMA-Wichita, KS
18	1005-01-055-3371	Guide, element	13	12	1	0	F09603-82-G-2056-1182	DCASPRO-Burlington, VT
19	1005-00-449-2426	Chuting/50-caliber [6]	10	0	10	0	F09603-82-M-3727	USARPRO-Venice, CA [7]
			10	0	10	0	F09603-85-C-3725	DCASMA-Van Nuys, CA
	Subtotals		150	39	58	53		

See footnotes at end of table.

RESULTS OF TESTING BY FEDERAL SUPPLY CLASS (Continued)

FEDERAL SUPPLY CLASS 3130 -- BEARINGS, MOUNTED

Sample Number	NSN	Nomenclature	Number Tested	Number Conforming	Number Nonconforming Major	Number Nonconforming Minor	Contract Number	Quality Assurance Representative
30	3130-00-355-2794	Housing bearing	2	0	0	2	N00383-83-G-3500-RJU4	NAVPRO-St. Louis, MO
31	3130-00-056-3084	Cap assembly	19	12	0	7	N00383-84-G-4513-RJAE	NAVPRO-Stratford, CT
			3	0	0	3	F09603-80-G-0747-1569	NAVPRO-Stratford, CT
32	3130-00-941-1375	Hinge assembly	5	1	0	4	F09603-82-G-1386-1176	AFPRO-Marietta, GA 8/
33	3130-00-523-5540	Bearing assembly	21	13	0	8	F09603-82-G-2267-0001	DCASMA-Hartford, CT
34	3130-00-110-7202	Block, bearing	2	0	0	2	F09603-84-G-1399-0023	DCASPRO-Burlington, VT
35	3130-00-938-0953	Bearing unit, ball	2	0	0	2	F09603-82-G-1386-YQ67	AFPRO-Marietta, GA
36	3130-00-056-5988	Housing, bearing, out	10	4	0	6	F09603-80-G-0747-0107	NAVPRO-Stratford, CT
37	3130-00-296-4598	Plate, retaining, bearing	10	0	10	0	F09603-85-C-0457	DCASMA-Springfield, NJ
			10	0	10	0	N00383-82-G-2911-RJ24	DCASMA-Springfield, NJ
38	3130-00-909-8721	Housing assembly	2	0	0	2	F09603-80-G-0884-0223	DCASMA-Ottawa, Canada
39	3130-01-142-0742	Ring	2	1	0	1	F04606-81-G-0075-RJ02	DCASPRO-Newport Beach, CA
	Subtotals		88	31	20	37		

See footnotes at end of table.

RESULTS OF TESTING BY FEDERAL SUPPLY CLASS (Continued)

FEDERAL SUPPLY CLASS 5120 -- HAND TOOLS, NONEDGED, NONPOWERED

Sample Number	NSN	Nomenclature	Number Tested	Number Conforming	Number Nonconforming Major	Number Nonconforming Minor	Contract Number	Quality Assurance Representative
80	5120-00-309-7249	Bolt puller	5	2	0	3	F09603-86-M-8897	DCASMA-Hartford, CT
81	5120-00-849-9573	Socket wrench	4	1	0	3	F09603-85-M-2251	DCASMA-Dallas, TX
82	5120-01-102-8987	Jaw, lower	2	0	0	2	F34601-81-G-0002-RJ4Q	AFPRO-West Palm Beach, FL
83	5120-01-121-5715	Driver tool	2	2	0	0	F34601-85-G-0047-RJ03	DCASPRO-Rockford, IL
84	5120-00-758-1487	Tool, remover	10	5	0	5	F09603-86-M-5218	DCASMA-Baltimore, MD
85	5120-01-102-6179	Wrench body	2 1	0 0	0 0	2 1	F34601-81-G-0002-RJ2F F34601-81-G-0002-RJ98	AFPRO-West Palm Beach, FL AFPRO-West Palm Beach, FL
86	5120-00-421-0435	Hand tool	0 9/ 0	0 0	0 0	0 0	F09603-85-C-0623 F09603-86-M-8670	DCASMA-Philadelphia, PA DCASMA-Philadelphia, PA
87	5120-00-386-6567	Socket wrench	5	0	0	5	F09603-84-C-2508	DCASMA-Santa Ana, CA
88	5120-01-134-2876	Wrench	2	0	0	2	F09603-84-M-8621	AFPRO-Cincinnati, OH
89	5120-01-191-1875	Riveter button	5	5	0	0	F33657-80-C-0167	AFPRO-West Palm Beach, FL
	Subtotals		38	15	0	23		

See footnotes at end of table.

RESULTS OF TESTING BY FEDERAL SUPPLY CLASS (Continued)

FEDERAL SUPPLY GROUP 5300 -- HARDWARE

Sample Number	NSN	Nomenclature	Number Tested	Number Conforming	Number Nonconforming Major	Number Nonconforming Minor	Contract Number	Quality Assurance Representative
VS-1	5306-00-489-1333	Bolt	10	0	10	0	N00383-83-G-3503-RJ2H	NAVPRO-Stratford, CT
			10	0	10	0	N00383-84-G-4513-RJET	NAVPRO-Stratford, CT
VS-2	5306-00-356-2619	Screw	10	0	0	10	F09603-85-M-4511	DCASMA-Baltimore, MD
VS-3	5306-00-235-6233	Bolt	10	10	0	0	F09603-84-G-1434-0076	AFPRO-Marietta, GA
VS-4	5307-00-169-8687	Stud	13	10	0	3	F09603-86-M-4715	DCASMA-Garden City, NY
VS-5	5307-00-511-4828	Stud, extension	10	0	0	10	F09603-84-G-1379-0084	DCASMA-Orlando, FL
			10	0	0	10	F04606-83-G-0041-RJ37	DCASMA-Santa Ana, CA
VS-6	5310-00-496-1003	Washer, insulator, resistor	10	0	0	10	F04606-84-G-0040-RJ10	DCASMA-Santa Ana, CA
VS-7	5315-00-171-8241	Pin, retainer ring	15	0	0	15	F09603-85-M-2850	DCASMA-Van Nuys, CA
	Subtotals		98	20	20	58		
	Totals		374	105	98	171		

[1] NSN -- National Stock Number

[2] DCASPRO -- Defense Contract Administration Services Plant Representative Office

[3] DCASMA -- Defense Contract Administration Services Management Area

[4] The transfer unit is an assembly of 84 parts, of which 13 were tested. Laboratory tests confirmed only 1 nonconformance in only 1 of the 13 subparts tested.

[5] NAVPRO -- Naval Plant Representative Office

RESULTS OF TESTING BY FEDERAL SUPPLY CLASS (Continued)

FEDERAL SUPPLY GROUP 5300 -- HARDWARE

6/ Part conforms to the contract. However, the contract does not include the most current specifications and therefore does not meet user requirements.

7/ USARPRO -- U.S. Army Plant Representative Office

8/ AFPRO -- Air Force Plant Representative Office

9/ NSN not tested because the drawings needed to test the item adequately were proprietary and were not available.

STATISTICAL PROJECTIONS OF TEST RESULTS

BY NUMBER OF PARTS

Federal Supply Class	Universe		Test Result Point Estimates 1/							
			Conforming		Major Nonconformance		Minor Nonconformance		Undetermined	
	NSN's 2/	Parts	Percent	Parts	Percent	Parts	Percent	Parts	Percent	Parts
1005	1,552	647,922	8.1	52,482	65.4	423,741	26.5	171,699	0	0
3130	19	2,409	38.5	928	30.6	737	30.9	744	0	0
5120 3/	638	23,003	21.8	5,015	0	0	28.1	6,464	50.1	11,524
5300 4/	7	12,591	2.2	274	6.1	766	91.7	11,551	0	0

[1/] The point estimates were calculated at the 90-percent confidence level with a precision of ± 3.2 percent for Federal Supply Class (FSC) 1005, ± 14 percent for FSC 3130, and ± 9 percent for FSC 5120 and the seven National Stock Numbers in the Hardware Federal Supply Group.

[2/] NSN -- National Stock Number.

[3/] One National Stock Number could not be adequately tested because the contractor was unwilling to release proprietary data.

[4/] Summary of only seven National Stock Numbers in the Hardware Federal Supply Group. These results are not statistically projectable to Federal Supply Group 5300. Test results are only projectable to the universe for each National Stock Number.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY NUMBER OF PARTS
FEDERAL SUPPLY CLASS 1005 -- GUNS THROUGH 30 MILLIMETERS

Sample Number	Nomenclature	Parts	Test Units in Sample	Test Result Point Estimates [1] Conforming Number	Major Number	Minor Number
1	Track, fixed forward	268	32	0	227	41
2	Gear spacer	8	2	0	0	8
3	Transfer unit	31	5	0	0	31
4	Gun end	62	13	62	0	0
5	Scoop shaft assembly	230	13	0	53	177
6	Aft structure assembly	4	2	0	0	4
7	Sprocket assembly	90	5	0	0	90
8	Retainer partition	10,536	80	0	10,536	0
9	Shaft shoulder	31	8	16	0	15
10	Rod, extension	22	5	22	0	0
11	Shaft	30	8	12	0	18
12	Coil assembly	11	3	11	0	0
13	Link, loader mounting	33	8	0	0	33
14	Modular assembly, feed	2	2	0	0	2
15	Support assembly	4	2	0	0	4
16	Shaft shouldered	166	13	0	0	166
17	Cover	137	13	0	137	0
18	Guide, element	62	13	57	5	0
19	Chuting/50-caliber	915	80	0	915	0
	Sample totals [2]	12,642	307 [3]	180	11,873	589
		(100%)		(1.4%)	(93.9%)	(4.7%)
	Universe totals [4]	647,922		52,482	423,741	171,699
				(8.1%)	(65.4%)	(26.5%)

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[1] The point estimates were calculated at the 90-percent confidence level with a precision of ± 3.2 percent.

[2] Totals are for the 19 National Stock Numbers in the sample for this Federal Supply Class.

[3] Of the 307 units in the sample, 150 units were actually tested. The number tested for each National Stock Number is listed by contract number on pages 1 and 2 of Appendix G.

[4] Totals are for all 1,552 National Stock Numbers in the universe for this Federal Supply Class. The smoothed weight of 117 parts of sample no. 8 was used for projections in this Federal Supply Class. The calculations for the smoothed percentages are shown on pages 3 and 5 of Appendix F.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY NUMBER OF PARTS
FEDERAL SUPPLY CLASS 3130 -- BEARINGS, MOUNTED

Sample Number	Nomenclature	Parts	Test Units in Sample	Test Result Point Estimates 1/ Conforming Number	Major Number	Minor Number
30	Housing bearing	7	2	0	0	7
31	Cap assembly	745	80	406	0	339
32	Hinge assembly	43	5	9	0	34
33	Bearing assembly	588	50	364	0	224
34	Block, bearing	3	2	0	0	3
35	Bearing unit, ball	5	2	0	0	5
36	Housing, bearing, out	17	10	7	0	10
37	Plate, retaining, bearing	627	80	0	627	0
38	Housing assembly	10	2	0	0	10
39	Ring	4	2	2	0	2
	Sample totals 2/	2,049 (100%)	235 3/	788 (38.5%)	627 (30.6%)	634 (30.9%)
	Universe totals 4/	2,409		928	737	744

1/ The point estimates were calculated at the 90-percent confidence level with a precision of ± 14 percent.

2/ Totals are for the 10 National Stock Numbers in the sample for this Federal Supply Class.

3/ Of the 235 units in the sample, 88 units were actually tested. The number tested for each National Stock Number is listed by contract number on page 3 of Appendix G.

4/ Totals are for all 19 National Stock Numbers in the universe for this Federal Supply Class.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY NUMBER OF PARTS
FEDERAL SUPPLY CLASS 5120 -- HAND TOOLS NONEDGED, NONPOWERED

Sample Number	Nomenclature	Parts	Test Units in Sample	Test Result Point Estimates 1/			
				Conforming Number	Major Number	Minor Number	Undetermined Number
80	Bolt puller	14	5	6	0	8	0
81	Socket wrench	15	3	4	0	11	0
82	Jaw, lower	9	2	0	0	9	0
83	Driver tool	11	2	11	0	0	0
84	Tool remover	490	50	245	0	245	0
85	Wrench body	20	3	0	0	20	0
86	Hand tool	692	20	0	0	0	692
87	Socket wrench	89	5	0	0	89	0
88	Wrench	6	2	0	0	6	0
89	Riveter button	36	8	36	0	0	0
	Sample totals 2/	1,382	100 3/	302	0	388	692
		(100%)		(21.8%)	(0.0%)	(28.1%)	(50.1%)
	Universe totals 4/	23,003		5,015	0	6,464	11,524

1/ The point estimates were calculated at the 90-percent confidence level with a precision of ± 9 percent.

2/ Totals are for the 10 National Stock Numbers in the sample for this Federal Supply Class.

3/ Of the 100 units in the sample, 38 units were actually tested. The number tested for each National Stock Number is listed by contract number on page 4 of Appendix G.

4/ Totals are for all 638 National Stock Numbers in the universe for this Federal Supply Class.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY NUMBER OF PARTS
FEDERAL SUPPLY GROUP 5300 -- HARDWARE

Sample Number	Nomenclature	Parts	Test Units in Sample	Test Result Point Estimates 1/ Conforming Number	Major Number	Minor Number
VS-1	Bolt	766	80	0	766	0
VS-2	Screw	500	50	0	0	500
VS-3	Bolt	240	32	240	0	0
VS-4	Stud	44	13	34	0	10
VS-5	Stud, extension	8,918	80	0	0	8,918
VS-6	Washer, insulator, resistor	1,695	80	0	0	1,695
VS-7	Pin, retainer ring	428	50	0	0	428
	Totals	12,591 (100%)	385 2/	274 (2.2%)	766 (6.1%)	11,551 (91.7%)

1/ The point estimates were calculated at the 90-percent confidence level with a precision of ± 9 percent.

2/ Of the 385 units in the sample, 98 units were actually tested. The number tested for each National Stock Number is listed by contract number on page 5 of Appendix G.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY DOLLAR VALUE

Federal Supply Class	Universe		Test Result Point Estimates 1/							
			Conforming		Major Nonconformance		Minor Nonconformance		Undetermined	
	NSN's 2/	Value (000)	Percent	Value (000)	Percent	Value (000)	Percent	Value (000)	Percent	Value (000)
1005	1,552	$110,404	5.9	$6,514	13.0	$14,352	81.1	$89,538	0	$0
3130	19	$396	35.6	$141	34.5	$137	29.9	$118	0	$0
5120 3/	638	$1,604	7.6	$122	0	$0	29.9	$480	62.5	$1,003
5300 4/	7	$44	3.7	$2	43.9	$19	52.4	$23	0	$0

1/ The point estimates were calculated at the 90-percent confidence level with a precision of ± 10.2 percent for Federal Supply Class (FSC) 1005, ± 7.8 percent for FSC 3130, and ± 9 percent for FSC 5120 and for the seven National Stock Numbers in the Hardware Federal Supply Group.

2/ NSN -- National Stock Number.

3/ One National Stock Number could not be adequately tested because the contractor was unwilling to release proprietary data.

4/ Summary of only seven National Stock Numbers in the Hardware Federal Supply Group. These results are not statistically projectable to the 5300 Federal Supply Group. Test results are only projectable to the universe for each National Stock Number.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY DOLLAR VALUE
FEDERAL SUPPLY CLASS 1005 -- GUNS THROUGH 30 MILLIMETERS

Sample Number	Nomenclature	Total Value of Parts	Test Sample Value	Test Result Point Estimates 1/ Conforming Dollars	Major Dollars	Minor Dollars
1	Track, fixed forward	$ 24,409	$ 2,915	$ 0	$ 20,654	$ 3,755
2	Gear spacer	234	59	0	0	234
3	Transfer unit	379,673	61,238	0	0	379,673
4	Gun end	6,871	1,441	6,871	0	0
5	Scoop shaft assembly	17,193	972	0	3,968	13,225
6	Aft structure assembly	33,758	16,879	0	0	33,758
7	Sprocket assembly	11,558	642	0	0	11,558
8	Retainer partition	382,141	2,902	0	382,141	0
9	Shaft shoulder	7,016	1,811	3,508	0	3,508
10	Rod, extension	100	23	100	0	0
11	Shaft	1,300	347	520	0	780
12	Coil assembly	606	165	606	0	0
13	Link, loader mounting	239	58	0	0	239
14	Modular assembly, feed	706	706	0	0	706
15	Support assembly	13,724	6,862	0	0	13,724
16	Shaft shouldered	90,659	7,100	0	0	90,659
17	Cover	11,422	1,084	0	11,422	0
18	Guide, element	31,208	6,544	28,807	2,401	0
19	Chuting/50-caliber	14,210	1,242	0	14,210	0
	Sample totals 2/	$1,027,027	$112,990 3/	$40,412	$434,796	$551,819
		(100%)		(3.9%)	(42.4%)	(53.7%)
	Universe totals 4/	$110,404,000		$6,514,000	$14,352,000	$89,538,000
				(5.9%)	(13.0%)	(81.1%)

1/ The point estimates were calculated at the 90-percent confidence level with a precision of ± 10.2 percent.

2/ Totals are for the 19 National Stock Numbers in the sample for this Federal Supply Class.

3/ The sample value in Appendix C is $112,986. The difference of $4 is due to rounding.

4/ Totals are for all 1,552 National Stock Numbers in the universe for this Federal Supply Class. The smoothed weight of $35,827 for sample no. 8 was used for projections in this Federal Supply Class. The calculations for the smoothed percentages are shown on pages 3 and 5 of Appendix F.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY DOLLAR VALUE
FEDERAL SUPPLY CLASS 3130 -- BEARINGS, MOUNTED

Sample Number	Nomenclature	Total Value of Parts	Test Sample Value	Test Result Point Estimates 1/ Conforming Dollars	Major Dollars	Minor Dollars
30	Housing bearing	$ 2,026	$ 579	$ 0	$ 0	$ 2,026
31	Cap assembly	106,297	11,414	57,980	0	48,317
32	Hinge assembly	11,882	1,382	2,376	0	9,506
33	Bearing assembly	118,164	10,048	73,149	0	45,015
34	Block, bearing	828	552	0	0	828
35	Bearing unit, ball	1,022	409	0	0	1,022
36	Housing, bearing, out	8,049	4,735	3,220	0	4,829
37	Plate, retaining, bearing	133,382	17,018	0	133,382	0
38	Housing assembly	3,523	705	0	0	3,523
39	Ring	1,368	684	684	0	684
	Sample totals 2/	$386,541	$47,526	$137,409	$133,382	$115,750
		(100%)		(35.6%)	(34.5%)	[illegible]
	Universe totals 3/	$395,678		$140,861	$136,509	[illegible]

1/ The point estimates were calculated at a 90-percent confidence level with a precision of ± 7.8 percent.

2/ Totals are for the 10 National Stock Numbers in the sample for this Federal Supply Class.

3/ Totals are for all 19 National Stock Numbers in the universe for this Federal Supply Class.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY DOLLAR VALUE

FEDERAL SUPPLY CLASS 5120 -- HAND TOOLS NONEDGED, NONPOWERED

Sample Number	Nomenclature	Total Value of Parts	Test Sample Value	Test Result Point Estimates 1/ Conforming Dollars	Major Dollars	Minor Dollars	Undetermined Dollars
80	Bolt puller	$ 1,525	$ 545	$ 610	$0	$ 915	$ 0
81	Socket wrench	1,323	265	331	0	992	0
82	Jaw, lower	3,865	859	0	0	3,865	0
83	Driver tool	1,580	287	1,580	0	0	0
84	Tool, remover	10,090	1,030	5,045	0	5,045	0
85	Wrench body	5,956	893	0	0	5,956	0
86	Hand tool	67,339	1,946	0	0	0	67,339
87	Socket wrench	13,508	759	0	0	13,508	0
88	Wrench	1,917	639	0	0	1,917	0
89	Riveter button	575	128	575	0	0	0
	Sample totals 2/	$107,678 (100%)	$7,351 3/	$8,141 (7.6%)	$0 (0.0%)	$32,198 (29.9%)	$67,339 (62.5%)
	Universe totals 4/	$1,604,000 5/		$121,904	$0	$479,596	$1,002,500

1/ The point estimates were calculated at the 90-percent confidence level with a precision of ± 9 percent.

2/ Totals are for the 10 National Stock Numbers in the sample for this Federal Supply Class.

3/ The sample value in Appendix C is $7,350. The difference of $1 is due to rounding.

4/ Totals are for all 638 National Stock Numbers in the universe for this Federal Supply Class.

5/ The universe value in Appendix C is $1,604,239. The $239 difference is due to rounding.

STATISTICAL PROJECTIONS OF TEST RESULTS (Continued)

BY DOLLAR VALUE
FEDERAL SUPPLY GROUP 5300 -- HARDWARE

Sample Number	Nomenclature	Total Value of Parts	Test Sample Value	Test Result Point Estimates 1/ Conforming Dollars	Major Dollars	Minor Dollars
VS-1	Bolt	$19,142	$1,999	$ 0	$19,142	$ 0
VS-2	Screw	920	92	0	0	920
VS-3	Bolt	610	81	610	0	0
VS-4	Stud	1,268	375	975	0	293
VS-5	Stud, extension	20,601	185	0	0	20,601
VS-6	Washer, insulator, transistor	763	36	0	0	763
VS-7	Pin, retainer ring	265	31	0	0	265
	Totals	$43,569 (100%)	$2,799	$1,585 (3.7%)	$19,142 (43.9%)	$22,842 (52.4%)

1/ The point estimates were calculated at the 90-percent confidence level with a precision of ± 9 percent.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES

Summary Of Parts With Major Nonconformances

Sample Number	Nomenclature	Number Tested	Number Nonconforming Major	Number Nonconforming Minor	Appendix Page Number
1	Track, Fixed Forward	13	11	2	2 of 20
5	Scoop Shaft Assembly	11	1	10	4 of 20
5	Scoop Shaft Assembly	2	2	0	5 of 20
8	Retainer Partition	5	5	0	7 of 20
8	Retainer Partition	5	5	0	9 of 20
17	Cover	13	13	0	10 of 20
18	Guide, Element	13 1/	1	0	12 of 20
19	Chuting/50-Calibar	10	10 2/	0	14 of 20
37	Plate, Retaining, Bearing	20	20	0	16 of 20
VS-1	Bolt	20	20	0	18 of 20
	Totals	112	88 3/	12	

1/ Of the tested parts, 12 were found to be conforming.

2/ Part does not conform to user requirements; however, it does conform to contract specifications as described incorrectly in a Hughes parts bulletin. Of the 20 parts tested, 10 belonged to Hughes under a separate contract. We did not visit Hughes because it has discontinued manufacture of the part.

3/ Does not include 10 parts in sample no. 19 that were manufactured by Hughes.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Sample Number: 1
Nomenclature: Track, fixed forward.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The fixed track is used on the inner drum and carrier belt assembly of the 30-millimeter GPU 5/A gun pod.

National Stock Number: 1005-01-120-2279.

Prime Contractor: General Electric, Armament & Electrical Systems Department, Burlington, Vermont.

Type of Contract: Negotiated sole-source, firm-fixed price.

Contract Number	Price	Quantity
F09603-82-G-2056-0102	$18,979.48	226 units
F09603-82-G-2056-1230	$ 1,114.92	12 units
F09603-82-G-2056-0066	$ 2,519.40	30 units

Total Quantity of this Part Supplied to Warner Robins Air Logistics Center (the Logistics Center): 278 units from January 1981 through August 1984.

Results of Visit to Contractor's Production Facility: The tracks were produced for General Electric by a subcontractor. Tests conducted by General Electric during our visit showed that the grade of plastic material used for the track did not conform to the material content, tensile strength, or specific gravity as specified in the contract requirements. Personnel at General Electric told us that this material was used in their tracks before a class 2 engineering change and that the Air Force granted permission to use up its old stock. We could not find any evidence either in the contract files or in Material Review Board actions to support the decision to use the old tracks to fill the delivery orders.

Type of Government Quality Assurance: In-plant quality assurance representatives from the Defense Contract Administration Services Plant Representative Office, Burlington, Vermont.

Initial Test Results: The 13 parts, purchased under 3 different delivery orders, were tested. Parts purchased under all three orders contained dimensional nonconformances. Parts purchased under two of the three orders failed material content tests.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Results of Retest: The prime contractor verified minor dimensional nonconformances in the parts. The prime contractor also verified nonconformances with material content, tensile strength, and specific gravity in the parts.

Engineers' Conclusions: The Logistics Center engineer stated: "The discrepancies . . . are serious enough to cause a reduction in service of the part." An engineer from the Office of the Inspector General, DoD, concluded that the nonconformances of material content adversely affected the durability of the tracks and constituted major nonconformances.

Logistics Center's Retest: No retest was performed on this sample.

Material Deficiency Investigation Report: Dimensional variations were previously reviewed by the Material Review Board. The material variations were due to a product improvement engineering change that occurred during the fabrication cycle. The Defense Contract Administration Services Plant Representative Office at General Electric agreed that the fixed track, as supplied by General Electric Company, was conforming to the drawing material requirements at the time of manufacture. The dimensional variations are totally serviceable without any adverse effect on performance or reliability.

Logistics Center's Position (as of January 5, 1989): The parts contained minor nonconformances and were considered serviceable.

Auditors' Position: We disagreed with the Logistics Center's position on these parts and considered the parts to contain major nonconformances. A combination of minor dimensional nonconformances and weaker material makes the parts supplied less durable than a conforming part with the improved material. There was considerable evidence that the Logistics Center intended to buy the improved part. The last price for the part before the product improvement was $55. After the product improvement was instituted in May 1983, the price of the product increased to $104; however, three units containing the old material were delivered to the Government in June 1983 at the increased price. One year later, in June 1984, General Electric delivered 30 units made of the improved material at a price of $84 per unit. Later in 1984, 238 more units were delivered (12 units at $93 per unit and 226 units at $84 per unit). All 238 units were made of nonconforming material. After the product improvement engineering change, the Air Force paid about $7,000 more for 241 fixed tracks made of nonconforming material

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

that General Electric claimed to be carry-over stock. In our opinion, the Air Force paid more for a less durable item.

Sample Number: 5
Nomenclature: Scoop shaft assembly.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The scoop shaft assembly transfers 20-millimeter ammunition in the M61A gun assembly.

National Stock Number: 1005-00-893-8231.

Prime Contractor: Four Star Precision Products, Incorporated, Van Nuys, California.

Type of Contract: Negotiated, small business-small purchase set-aside, firm-fixed price.

Contract Number	Price	Quantity
F09603-85-M-4935	$6,176.25	81 units

Total Quantity of this Part Supplied to the Logistics Center: 1,023 units from June 1976 through October 1983.

Results of Visit to Contractor's Production Facility: Four Star Precision, the prime contractor, produced the tested parts. A subcontractor performed the brazing, heat treatment, and plating of the parts. The manufacturing inspections that the contractor performed were inadequate for the production of this part. A Material Deficiency Report had been issued for a prior contract for this same part. The report identified a perpendicularity problem in the part.

Type of Government Quality Assurance: Itinerant quality assurance representative from the Defense Contract Administration Services Management Area, Van Nuys, California.

Initial Test Results: The 11 parts, purchased under the same contract, were tested. On 1 of 11 parts tested, perpendicularity of sprockets to the shaft was found to be unacceptable.

Results of Retest: No retest was performed because the prime contractor concurred with the perpendicularity problems.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Engineers' Conclusions: An engineer from the Logistics Center measured the perpendicularity and determined that the part was not in conformance with dimensional specifications. The engineer further determined that the nonconformance was major. An engineer from the Office of the Inspector General, DoD, concluded that the nonconformance adversely affected durability, performance, and effective use of the part. Consequently, this part should be classified as a major nonconformance.

Logistics Center's Retest: The retest results confirmed initial test results. The Logistics Center planned to test the perpendicularity of remaining stock in the inventory and remove those with major nonconformances.

Material Deficiency Investigation Report: This part represented a quality problem. The investigation confirmed dimensional discrepancies. However, the parts investigated were considered functional by the contractor.

Logistics Center's Position (as of January 5, 1989): Major nonconformance because one part contained a dimensional perpendicularity nonconformance.

Auditors' Position: Major nonconformance for only 1 of 11 parts tested, but all 11 parts tested contained other minor dimensional or hardness nonconformances.

Sample Number: 5
Nomenclature: Scoop shaft assembly.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The scoop shaft assembly transfers 20-millimeter ammunition in the M61A gun assembly.

National Stock Number: 1005-00-893-8231.

Prime Contractor: Model & Graphics Associates, Incorporated, Naples, Florida.

Type of Contract: Negotiated, small business-small purchase set-aside, firm-fixed price.

Contract Number	Price	Quantity
F09603-84-C-4550	$10,453.00	149 units

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Total Quantity of this Part Supplied to the Logistics Center: 1,023 units from June 1976 through October 1983.

Results of Visit to Contractor's Production Facility: The prime contractor, Model & Graphics Associates, Incorporated, produced the tested parts. A subcontractor performed the brazing, heat treatment, and plating of the parts. The manufacturing inspections and the test equipment that the contractor maintained were inadequate for the production of this part.

Type of Government Quality Assurance: Itinerant quality assurance representative from the Defense Contract Administration Services Management Area, Orlando, Florida.

Initial Test Results: Two parts, purchased under the same contract, were tested. On both parts, perpendicularity of sprockets to the shaft was found to be unacceptable.

Results of Retest: No retest was performed because the prime contractor concurred with the perpendicularity problems.

Engineers' Conclusions: An engineer from the Logistics Center measured the perpendicularity and determined that the part was not in conformance with dimensional specifications and would not withstand a required first article axial push test. The engineer further determined that the nonconformances were major. An engineer from the Office of the Inspector General, DoD, concluded that the nonconformances adversely affected durability, performance, and effective use of the part. Consequently, this part should be classified as a major nonconformance.

Logistics Center's Retest: The retest results confirmed initial test results. The Logistics Center intends to test the perpendicularity of remaining stock in the inventory and remove those with major nonconformances.

Material Deficiency Investigation Report: Model & Graphics Associates, Incorporated, no longer exists. The cause of the deficiency could not be established. During investigation, it was disclosed that excess temperatures caused hardness to fall below the piece-part requirements. The report did not contain adequate information to determine whether perpendicularity was evaluated during the material deficiency investigation. An evaluation of current production practices at Southwest Regional Manufacturing, Incorporated, the company that purchased Model & Graphics Associates, Incorporated, was not appropriate.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Logistics Center's Position (as of January 5, 1989): Major nonconformance because the parts contained dimensional perpendicularity nonconformances.

Auditors' Position: Major nonconformance because the parts failed to meet hardness requirements and the parts contained significant dimensional nonconformances.

Sample Number: 8
Nomenclature: Retainer partition.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The retainer partition is part of the ammunition handling system that controls the positioning of the rounds between the drum cover and the scoop disc in the 20-millimeter gun assembly on the A-7D, F-4E, and F-16 aircraft.

National Stock Number: 1005-00-056-5837.

Prime Contractor: Handy Tool & Manufacturing Company, Incorporated, Woodside, New York.

Type of Contract: Negotiated, small business-small purchase set-aside, firm-fixed price.

Contract Number	Price	Quantity
F09603-84-C-3627	$73,635.30	2,101 sets

Total Quantity of this Part Supplied to the Logistics Center: 12,748 units from January 1983 through December 1986.

Results of Visit to Contractor's Production Facility: A subcontractor for the prime contractor, Handy Tool & Manufacturing Company produced the tested parts. The prime contractor's quality control over the subcontractor was inadequate. The manufacturing inspections and the test equipment that the contractor maintained were inadequate for the final inspection of this part.

Type of Government Quality Assurance: Itinerant quality assurance representative from the Defense Contract Administration Services Management Area, New York, New York.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Initial Test Results: Five parts from five different sets, purchased under the same contract, were tested. Various critical dimensions on all five parts nonconformed with the drawing specifications.

Results of Retest: No retest was performed because a test fixture, costing about $11,000, was required to test this part more accurately. The Air Force declined the opportunity to procure the test fixture for a more accurate test.

Engineers' Conclusions: The Supply Center engineer concluded that the tested parts failed to meet contract requirements. The Logistics Center's engineer stated that "Test plan dimensions B, C, D, E, S, and T are all very critical. These dimensions were off by a considerable margin. This type of discrepancy is totally unacceptable and would result in a part which cannot function." An engineer from the Office of the Inspector General, DoD, determined that these nonconformances constituted a major nonconformance.

Logistics Center's Retest: The Logistics Center had its own fixture and a computer program suitable for measuring the part. The retest results confirmed the results of the independent laboratory. The inventory under this contract was determined to be unusable.

Material Deficiency Investigation Report: A gauge approved by General Electric, Burlington, Vermont, was used to reinspect five parts. No discrepancies were found in the parts.

Logistics Center's Position (as of January 5, 1989): Major nonconformances but investigation still in progress.

Auditors' Position: The part contained major nonconformances. The gauge referred to in the Material Deficiency Investigation Report paragraph above and employed on behalf of Handy Tool & Manufacturing Company does not measure all of the critical dimensions for the part. The gauge was determined to be inadequate for testing all dimensions during the audit. The Logistics Center's retests confirmed the existence of major nonconformances. In January 1989, we requested that the Logistics Center retest the parts once more. An official from the Logistics Center informed us that further testing was not possible because remaining samples had been discarded and no more retainer partitions purchased under this contract remained in stock.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Sample Number: 8
Nomenclature: Retainer partition.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The retainer partition is part of the ammunition handling system that controls the positioning of the rounds between the drum cover and the scoop disc in the 20-millimeter gun assembly on the A-7D, F-4E, and F-16 fighter aircraft.

National Stock Number: 1005-00-056-5837.

Prime Contractor: Mil-Base Industries, New Cumberland, Pennsylvania.

Type of Contract: Negotiated, small business-small purchase set-aside, firm-fixed price.

Contract Number	Price	Quantity
F09603-85-C-4189	$248,983.19	8,435 sets

Total Quantity of this Part Supplied to the Logistics Center: 12,748 units from January 1983 through December 1986.

Results of Visit to Contractor's Production Facility: A subcontractor for the prime contractor, Mil-Base Industries, produced the tested parts. The manufacturing inspections and the test equipment that was maintained by the contractor were inadequate for the production of this part. The inadequacy of inspections and test equipment was validated on February 16, 1988, when a Quality Deficiency Report was initiated at Luke Air Force Base, Glendale, Arizona. The deficiency report stated that the partitions would not hold rounds of ammunition because of nonconforming dimensions that apparently were caused by partitions milled at different angles. These defects made the gun inoperable.

Type of Government Quality Assurance: Itinerant quality assurance representative from the Defense Contract Administration Services Management Area, Reading, Pennsylvania.

Initial Test Results: Five parts from five different sets, purchased under the same contract, were tested. Various critical dimensions on all five parts nonconformed with the drawing specifications.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Results of Retest: No retest was performed because a test fixture, costing about $11,000, was required to test this part more accurately. The Air Force declined the opportunity to procure the test fixture for a more accurate test.

Engineers' Conclusions: The Supply Center engineer concluded that the tested parts failed to meet contract requirements. The Logistics Center's engineer stated that "Test plan dimensions B, C, D, E, S, and T are all very critical. These dimensions were off by a considerable margin. This type of discrepancy is totally unacceptable and would result in a part which cannot function." An engineer from the Office of the Inspector General, DoD, agreed that these nonconformances constituted major nonconformances.

Logistics Center's Retest: The Logistics Center had its own fixture and a computer program suitable for measuring the part. The retest results confirmed the results of the independent laboratory. The inventory under this contract was determined to be unusable.

Material Deficiency Investigation Report: The investigation concluded that the part contained a material deficiency. The contractor, Mil-Base Industries, neither offered any corrective action nor offered to replace those units cited as defective because the parts in question were accepted by the Government and have been in the Government's possession for a period exceeding 1 year.

Logistics Center's Position (as of January 5, 1989): The parts had major nonconformances. The parts were considered defective and the identifiable shelf stock of contract F09603-85-C-4189 was removed from inventory.

Auditors' Position: The parts had major nonconformances.

Sample Number: 17
Nomenclature: Cover.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The cover adapts the link chute to the gun feeder and keeps dirt out of the 20-millimeter gun system on the F-5A aircraft.

National Stock Number: 1005-00-923-9719.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Prime Contractor: L and S Machine Company, Incorporated, Wichita, Kansas.

Type of Contract: Negotiated, competitive, firm-fixed price.

Contract Number	Price	Quantity
F34601-83-G-1755-RJA2	$3,390.40	47 units
F34601-85-G-0031-RJ06	$3,629.25	45 units
F34601-85-G-0031-RJ73	$3,827.25	45 units

Total Quantity of this Part Supplied to the Logistics Center: 213 units from March 1983 through September 1985.

Results of Visit to Contractor's Production Facility: A majority of the manufacturing processes on the tested parts were subcontracted for the prime contractor, L and S Machine Company, Incorporated. The prime contractor's control over subcontractor performance was inadequate. The prime contractor did not accomplish adequate inspections of the work that the subcontractors performed. The manufacturing flow of the parts required subcontractors to perform the initial portions of the manufacturing process. Subcontract work included casting the cover and providing an electropolish treatment. After the subcontract processes were completed, the parts were returned to the prime contractor and an incoming inspection was required. Prime contractor personnel informed us, however, that no dimensional check was performed during this incoming inspection because they were not aware that the dimensions should be verified. After receipt of the material from the subcontractor, the prime contractor performed several other manufacturing processes to complete the part. Although contractor quality control personnel performed a final inspection, no dimensional measurements were made.

Type of Government Quality Assurance: Itinerant quality assurance representative from the Defense Contract Administration Services Management Area, Wichita, Kansas.

Initial Test Results: The 13 parts, purchased under 3 different contracts, were tested. All 13 parts contained dimensional nonconformances.

Results of Retest: The 13 parts were retested. All 13 parts contained dimensional nonconformances.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Engineers' Conclusions: The Logistics Center's engineer noted that there were numerous dimensional nonconformances. An engineer from the Office of the Inspector General, DoD, determined that the numerous dimensional nonconformances reflected poor workmanship and constituted major nonconformances.

Logistics Center's Retest: The results of the Logistics Center's retests confirmed the existence of major nonconformances. All parts supplied under the three contracts were determined to be unusable as of September 15, 1988.

Material Deficiency Investigation Report: Subsequent testing by L and S Machine Company, Incorporated, resulted in the determination that only two areas were dimensionally deficient. Material in excess of the engineering drawing tolerance was determined to be the cause of the deficiencies. The Material Deficiency Investigation Report recommended that the current contract with L and S Machine Company, Incorporated, be amended to reflect a first article requirement to ensure fit, form, and function of the parts required. The report also recommended that the contractor's offer to rework the dimensions be evaluated.

Logistics Center's Position (as of January 5, 1989): The cover was considered serviceable and the dimensional nonconformance was a minor nonconformance.

Auditors' Position: We identified major nonconformances for 13 of 13 parts tested. The preponderance of evidence that two independent test laboratories provided and testing that the Logistics Center conducted indicated that the multiple nonconformances would adversely affect the durability of the part. This evidence contradicted the summary finding of the contractor as reported in the Material Deficiency Investigation Report. The Logistics Center did not provide the auditors with detailed test results for evaluation.

Sample Number: 18
Nomenclature: Guide, element.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The element guide is used in the ammunition loading access unit. It guides 20-millimeter ammunition through the gun system used in the F-16 aircraft ammunition handling set.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

National Stock Number: 1005-01-055-3371.

Prime Contractor: General Electric Company, Armament & Electrical Systems Department, Burlington, Vermont.

Type of Contract: Negotiated, sole-source, firm-fixed price.

Contract Number	Price	Quantity
F09603-82-G-2056-1182	$32,181.72	62 units

Total Quantity of this Part Supplied to the Logistics Center: 148 units from May 1979 through July 1986.

Results of Visit to Contractor's Production Facility: A subcontractor for the prime contractor, General Electric, Burlington, performed a majority of the manufacturing processes of the tested parts. The prime contractor's control over subcontractor performance was inadequate. The prime contractor did not accomplish adequate inspections of subcontractor work.

Type of Government Quality Assurance: In-plant quality assurance representative from the Defense Contract Administration Services Plant Representative Office, Burlington, Vermont.

Initial Test Results: One of the six parts tested contained a significant crack that can result in failure of the gun system.

Results of Retest: General Electric conducted a magnetic particle test and a liquid penetrant test that verified the existence of a crack.

Engineers' Conclusions: The Logistics Center's engineer stated that "The fact that sample part no. 7 has excessive cracks is serious. Cracks in the part, depending on the location and severity, can cause the part to fail in service causing a system stoppage." Only six parts were tested. The laboratory report made a numbering error and the engineer used the erroneous laboratory report sample number. The crack was on sample part no. 6. An engineer from the Office of the Inspector General, DoD, determined that the nonconformance was major and would affect the durability of the part.

Logistics Center's Retest: The retest results confirmed our previous conclusion that most of the parts conformed to specification. The Logistics Center's engineers agreed that only

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

one part in our sample was cracked. However, as a precaution, the remaining parts in the inventory will be inspected to determine whether any other element guides contained cracks and, if so, remove those parts from serviceable inventory.

Material Deficiency Investigation Report: The investigation concluded that the crack was a cosmetic surface defect in a non-functional, noncritical location on the surface of a part subjected to low-stress applications. It also concluded that no risk would be introduced if the part were used in a system. General Electric Company agreed to repair or replace the part at no cost to the Government.

Logistics Center's Position (as of January 5, 1989): After examining all parts in the inventory, the one part with a defective casting was considered an oddity and, therefore, this part was considered conforming. The parts were being shipped and used without restrictions.

Auditors' Position: Major nonconformance for 1 of 13 parts in the sample. The one part had a crack in its surface that adversely affected the part's durability.

Sample Number: 19
Nomenclature: Chuting/50-caliber.

Federal Supply Class: 1005, guns through 30 millimeters.

Description of Part: The chuting is comprised of several links that make a flexible chute used in the 50-caliber automatic chain gun. This assembly guides linked ammunition from the storage unit to the gun.

National Stock Number: 1005-00-449-2426.

Prime Contractor: Standard Armament, Incorporated, Glendale, California.

Type of Contract: Negotiated, sole-source, firm-fixed price.

Contract Number	Price	Quantity
F09603-85-C-3725	$37,287.36	2,354 units

(Note: Only 615 units were purchased for the Logistics Center. The remaining 1,739 units were purchased for Foreign Military Sales.)

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Total Quantity of this Part Supplied to the Logistics Center: 2,654 units from October 1982 through November 1985.

Results of Visit to Contractor's Production Facility: The prime contractor, Standard Armament, Incorporated, produced the tested parts. Although the part conformed to the contract specifications, it did not conform to the user requirements. The part was manufactured in accordance with dimensional characteristics detailed in a catalog, but the contract should have required that the part be made according to the drawings applicable to the National Stock Number.

Type of Government Quality Assurance: Itinerant quality assurance representative from the Defense Contract Administration Services Management Area, Van Nuys, California.

Initial Test Results: The 10 parts, purchased under the same contract, were tested. On all 10 parts tested, 5 critical dimensions were nonconforming.

Results of Retest: No retest was performed because it was determined to be unnecessary.

Engineers' Conclusions: The nonconformance occurred as a result of inaccurate specifications that the contracting officer cited. The Logistics Center's engineer stated that "The critical dimensions are out of tolerance. Since these dimensions are undersized, binding and jamming are very possible." The engineer also stated that "With such a high number of dimensions out of tolerance, the parts need to be rejected out of supply." An engineer from the Office of the Inspector General, DoD, agreed that the dimensional nonconformances constituted major nonconformances and would adversely affect the performance of the part.

Logistics Center's Retest: The results of the retest again showed numerous nonconformances. The Logistics Center's engineers determined that these nonconformances would adversely affect the performance of the assembly. The Logistics Center's engineers determined that all parts under this contract were not usable as of September 15, 1988.

Material Deficiency Investigation Report: The contractor could not verify the major nonconformances because the parts in question conformed to the catalog number. However, the parts did not conform to the drawing requirements that should have been specified in the contract. The major nonconformances were classified as a nonquality assurance problem and were attributed to contracting problems.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Logistics Center's Position (as of January 5, 1989): The parts were fully serviceable and, therefore, were classified as minor nonconformances.

Auditors' Position: The parts had major nonconformances. Although all 10 parts conformed to catalog requirements (as required in the contract), they did not conform with the drawing because of inaccurate contract specifications. The nonconformances were major because they were determined to be significant enough to adversely affect the performance of the part. The Air Force had not reviewed the specifications of this part to determine whether the specifications were unnecessarily restrictive.

Sample Number: 37
Nomenclature: Plate, retaining, bearing.

Federal Supply Class: 3130; bearings, mounted.

Description of Part: The bearing is used in the back-up emergency generator system on the F-15 aircraft.

National Stock Number: 3130-00-296-4598.

Prime Contractor: Allied Bendix Aerospace Electrical Power Division, Eatontown, New Jersey.

Type of Contract: Negotiated, sole-source, firm-fixed price.

Contract Number	Price	Quantity
F09603-85-C-0457	$46,655.00	215 units
N00383-82-G-2911-RJ24	$80,043.36	412 units

Total Quantity of this Part Supplied to the Logistics Center: 627 units from June 1984 through December 1984.

Results of Visit to Contractor's Production Facility: The prime contractor, Allied Bendix Aerospace, accomplished all manufacturing processes. The manufacturing inspections and the test equipment that the contractor maintained were inadequate for this part. The contractor's machine operator personnel accomplished all manufacturing dimensional checks of their work and most related quality procedures for the bearings. We noted that the machine operators were responsible for maintaining

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

proper calibration of their own measuring tools, such as micrometers and calipers. Additionally, the operator's cutting tools used to manufacture the retaining bearings were maintained in a central crib area. The contractor's quality control personnel had no control over the measurement or cutting tools.

Type of Government Quality Assurance: In-plant quality assurance representative from the Defense Contract Administration Services Management Area, Springfield, New Jersey.

Initial Test Results: The 20 parts, purchased under 2 different contracts, were tested. Numerous dimensional nonconformances were identified on all 20 parts tested. All 20 parts tested contained rough surface areas in "O" ring grooves. Surface roughness could cause premature wear of the "O" rings.

Results of Retest: No retest was performed because the prime contractor inspected a part and concurred with the surface roughness problem.

Engineers' Conclusions: The Supply Center's engineer concluded that there were numerous dimensions not in conformance with the drawing and that the surface roughness could cause premature wear on "O" rings that are used as seals. The Logistics Center's engineer stated that "There are several problems with this item and, overall, this item portrays poor workmanship." An engineer from the Office of the Inspector General, DoD, concluded that these nonconformances constituted major nonconformances and adversely affected the durability of the part.

Logistics Center's Retest: One part from the sample contract was included in the retest. The retest showed only one nonconforming dimension as opposed to an average of five nonconforming dimensions that the independent laboratory reported. The Logistics Center's engineers concluded that the parts were usable and the nonconformances were minor.

Auditors' Comments to Logistics Center's Retest: The engineer from the Office of the Inspector General, DoD, disagreed with the Logistics Center engineers' conclusions on the retest results. The engineer from the Office of the Inspector General, DoD, stated that the results of the retest on one part did not invalidate the test results of 20 parts by a well-equipped independent laboratory. In addition, the surface roughness could still cause premature wear on the "O" rings that are used as seals.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Material Deficiency Investigation Report: The results of the investigation confirmed that two of the six deficient parameters identified on the auditors' test report were consistently out of tolerance. Allied Bendix also acknowledged a deficiency for surface finishes attributed to excessive tool marks in the groove caused by overworn tooling. The radius deficiency was caused by using an improper tool bit. In an examination of on-hand stock, the contractor identified 42 defective parts and subsequently scrapped the parts.

Logistics Center's Position (as of January 5, 1989): Minor nonconformance because the parts were considered serviceable.

Auditors' Position: The parts have major nonconformances. Multiple dimensional and physical nonconformances were identified on all 20 parts tested. The Material Deficiency Investigation Report confirmed the nonconformances. These nonconformances can cause premature wear on the "O" rings.

Sample Number: VS-1
Nomenclature: Bolt.

Federal Supply Class: 5306, Bolts.

Description of Part: The bolt is used in the multiple disc coupling assembly on the tail drive shaft of the HH-3 helicopter.

National Stock Number: 5306-00-489-1333TH.

Prime Contractor: United Technologies Corporation, Sikorsky Aircraft Division, Stratford, Connecticut.

Type of Contract: Negotiated, sole source, firm-fixed price.

Contract Number	Price	Quantity
N00383-83-G-3503-RJ2H	$8,261.95	373 units
N00383-84-G-4513-RJET	$2,731.35	393 units

Total Quantity of this Part Supplied to the Logistics Center: 766 units from August 1984 through September 1985.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Results of Visit to Contractor's Production Facility: A subcontractor for the prime contractor, Sikorsky Aircraft Division of United Technologies Corporation, produced the tested parts. The prime contractor's control over the subcontractor was inadequate. The prime contractor's manufacturing inspections were inadequate for the production of this part.

Type of Government Quality Assurance: In-plant quality assurance representative from the Naval Plant Representative Office, Stratford, Connecticut.

Initial Test Results: Nonconforming dimensions were reported for 20 parts purchased under 2 different contracts.

Results of Retest: A retest showed that the required chamfer was missing on all 20 bolts. The prime contractor agreed that none of the bolts contained the required chamfer.

Engineers' Conclusions: Engineers from the Supply Center, Logistics Center, and the Office of Inspector General, DoD, and personnel from the prime contractor's office all agreed that none of the bolts conformed to the drawing. However, the Logistics Center's engineers contended that the missing chamfer would not adversely affect the effective use of the bolts. An engineer from the Office of the Inspector General, DoD, concluded that this nonconformance constituted a major nonconformance. The purpose of the chamfer is to reduce the possibility of misthreading the bolt. Therefore, the absence of a chamfer increases the potential for misthreading and could adversely affect the effective use of the bolt.

Logistics Center's Retest: The Logistics Center agreed that the chamfer was missing. The engineers at the Logistics Center provided the following comments on the use of the bolt.

> The bolt is used on the multi-disc coupling on the H-3 helicopter. The coupling is aft of the main gearbox and is accessible for the maintenance crews. The maintenance personnel should back thread the nut on the bolt until the threads jump. At that point, the mechanic knows that the threads are aligned and begins to thread the nut on the bolt. If the mechanic does misalign the nut and cross threads the bolt, the bolt and nut are easily replaceable from the multi-disc coupling. A cross threaded bolt has no affect on the multi-disc coupling.

DETAILS ON PARTS WITH MAJOR NONCONFORMANCES
(Continued)

Auditors' Comments to Logistics Center's Retest: The standard price for the bolts was listed at about $25 each. The engineer from the Office of the Inspector General, DoD, stated that the chamfer was specified to reduce the possibility of cross threading. Bolts without chamfers are more likely to be cross threaded, which adversely affects the durability and reliability. Also, the useful life of the bolt, nut, and possibly the multi-disc coupling could be adversely affected. Consequently, the engineer from the Office of the Inspector General, DoD, considered the nonconformance to be major.

Material Deficiency Investigation Report: A Material Deficiency Investigation Report was not provided to the audit team for evaluation. However, summary comments from the Air Force indicated that the contractor maintained that the chamfer, in fact, existed.

Logistics Center's Position: Minor nonconformance because the parts were fully serviceable.

Auditors' Position: The parts had a major nonconformance. In addition to other sources, we consulted with a bolt manufacturer to determine the effect of no chamfer. The president of the bolt manufacturing company stated that a highly specialized bolt used in a helicopter drive shaft should have a chamfer. Any bolts supplied without the required chamfer would have a major nonconformance because some of the bolts were more likely to misthread. During our review, officials from the Naval Plant Representative Office, Stratford, Connecticut, agreed that the bolt had no chamfer. In addition, bolts throughout the sample were inspected by members of the audit team and none of the bolts in the sample contained a chamfer. Apparently, the Logistics Center did not provide the bolts in the audit sample for the Material Deficiency Investigation.

SCOPE OF CONTRACTOR VISITS -- NUMBER OF CONTRACTS AND CONTRACTORS IN AUDIT SAMPLE

					DoD IG Audit Visits		
FSC 2/	Nomenclature	NSN's 1/ In Sample	Number of Contracts In Sample	Number of Contractors In Sample	Number of NSN's	Number of Contracts	Number of Contractors
1005	Guns Through 30mm 3/	19	31	16	13	21	10
3130	Mounted Bearings	10	12	6	4	7	2
5120	Hand Tools	10	12	8	2	2	2
5300	Hardware	7	9	6	1	2	1
	Totals	46	64	36	20	32	15

1/ NSN -- National Stock Number

2/ FSC -- Federal Supply Class

3/ mm -- millimeters

RESULTS OF CONTRACTOR VISITS -- QUALITY CONTROL INADEQUACIES

Sample Number	Contractor	Number of Contracts with Quality Control Inadequacies 1/	2/	3/	4/	Adequate 5/	Quality Assurance Representatives
1	General Electric, Burlington	3					DCASPRO-Burlington, VT 6/.... In-Plant
3	General Electric, Burlington					3	DCASPRO-Burlington, VT ...... In-Plant
5	Four Star Precision		1				DCASMA-Van Nuys, CA 7/....... Itinerant
5	Model & Graphics Assoc., Inc.		1	1	1		DCASMA-Orlando, FL........... Itinerant
6	General Electric, Burlington	1					DCASPRO-Burlington, VT ...... In-Plant
7	General Electric, Burlington					1	DCASPRO-Burlington, VT ...... In-Plant
8	Handy Tool & Manufacturing	1	1	1			DCASMA-New York, NY .... Itinerant
8	Mil-Base Industries	1	1	1	1		DCASMA-Reading, PA .... Itinerant
9	General Electric, Burlington					1	DCASPRO-Burlington, VT ...... In-Plant
10	Vickers, Inc.		1				DCASMA-Birmingham, AL........ In-Plant
13	Scott Craft Company		1	1	1		DCASMA-Inglewood, CA .... Itinerant
15	McDonnell Aircraft		1				NAVPRO-St. Louis, MO 8/...... In-Plant
16	General Electric, Burlington					2	DCASPRO-Burlington, VT ...... In-Plant
17	L and S Machine Company	3	3				DCASMA-Wichita, KS........... Itinerant
18	General Electric, Burlington	1	1				DCASPRO-Burlington, VT ...... In-Plant
19	Standard Armament, Inc.					1	DCASMA-Van Nuys, CA .... Itinerant
30	McDonnell Aircraft		1				NAVPRO-St. Louis, MO .... In-Plant
33	Chandler-Evans Division					1	DCASMA-Hartford, CT .... In-Plant
36	Sikorsky Aircraft Division	1					NAVPRO-Stratford, CT .... In-Plant
37	Allied Bendix Aerospace		2	2			DCASMA-Springfield, NJ ...... In-Plant
84	ARCO Metals, Inc.					1	DCASMA-Baltimore, MD .... Itinerant
87	Spec Tool					1	DCASMA-Santa Ana, CA .... Itinerant
VS-1	Sikorsky Aircraft Division	2	2				NAVPRO-Stratford, CT .... In-Plant
	Total Contracts	13	16	6	3	11	

1/ Subcontractor Performance
2/ Manufacturer Inspections
3/ Test Equipment
4/ Independence of Quality Function
5/ There was no subcontractor involvement in these contracts.
6/ DCASPRO -- Defense Contract Administration Services Plant Representative Office
7/ DCASMA -- Defense Contract Administration Services Management Area
8/ NAVPRO -- Naval Plant Representative Office

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-8000

PRODUCTION AND
LOGISTICS

(TQM/IPQ)

DEC 30 1988

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING

Subject: Draft Report on the Audit of Nonconforming Products in the Defense Supply System at Warner Robins Air Logistics Center (Project No. 6AC-101)

This is in response to your memorandum of September 29, 1988, requesting comments on the subject draft report. It is my understanding that the Air Force and the Defense Logistics Agency have not yet had the opportunity to substantiate the findings of the draft report, and that they will be providing their comments directly to you.

The recommendations made to this office have merit and will be properly evaluated by the Department of Defense Quality Assurance Council subsequent to issuance of final report.

Jack Katzen

DEPARTMENT OF THE NAVY
OFFICE OF THE ASSISTANT SECRETARY
(SHIPBUILDING AND LOGISTICS)
WASHINGTON, DC 20360-5000

JAN 16 1989

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE INSPECTOR GENERAL FOR AUDITING

Subj: DRAFT REPORT ON THE AUDIT OF NONCONFORMING PRODUCTS IN THE DEFENSE SUPPLY SYSTEM AT WARNER ROBINS AIR LOGISTICS CENTER (PROJECT #6AC-101)

Encl: (1) Comments on subject draft report

The subject draft report has been reviewed and comments are provided in enclosure (1). DOD Quality Assurance initiatives should promulgate quality management concepts that are part of general DOD management and not just included as a special added program. We concur that subcontractor supplied material is a difficult area of quality but feel that the Navy Quality Deficiency Reporting (QDR) system implements additional testing above and beyond stand alone test programs. Paragraph (C) of enclosure (1) cites further specific recommendations for corrective action.

EVERETT PYATT
ASSISTANT SECRETARY OF THE NAVY
(SHIPBUILDING AND LOGISTICS)

Copy to:
NAVCOMP (NCB-5)
NAVINSGEN

Comments on Draft Report (Project #6AC101) Final Repor
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A. General comments regarding quality management as part of general DOD management.

a. DOD Quality Assurance initiatives should recognize and incorporate quality management concepts in its approach to reduce not only the nonconforming products accepted in the Defense Supply System, but also the nonconforming products produced. These concepts should be a part of general DOD management and not merely included as a special added program (as in Appendix A). To ensure the reforms in performance that are sought, these management and quality principles must also be appropriately incorporated in revised DOD auditing policy and practices.

b. The quality management approach is being spearheaded in DOD by the Under Secretary of Defense (Acquisition) and in DON by the Under Secretary of the Navy. Among the concepts being tested, under this approach, are error prevention rather than error detection, and a focus on a culture that encourages the continuous improvement of quality instead of penalizing poor quality.

B. General comments on page 11-37 findings 7-22

a. Page 23 - Subcontractor Supplied Material. This is a difficult area of quality. The thousands of contractors and the decreasing resources to provide surveillance make for an ever increasing challenge in this area. 13

b. Page 34 - Testing. Do not concur that the "inability of the QDR system to provide effective feedback" is justification for a selective testing program. Such a testing program should and does stand on its own. The QDR program employed by Navy is not only a program to ensure corrective actions to preclude recurrence are taken, but is a "red flag" for determining whether further action is required on in stock and installed materials. The QDR is the tool to implement additional testing - above and beyond stand alone test programs. Additionally, the QDR is used as a management tool to aid procurement officers in determining responsibility of prospective awardees. 18*

C. Comments relative to recommendations for corrective action.

1.a. Concur. At times the terms "nonconformance" and "defect" and the variances of each have caused confusion. In addition consideration should be given to include the word "deficient".

1.b. Current regulations regarding the description of nonconformances, the corrective actions to be taken and the responsibility of Government quality assurance representatives for assuring contractors initiate effective corrective action may require some minor clarifications but are considered generally adequate.

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* Subheading now titled "Timely Testing for Quality"

1.c. (1) Concur. Laboratory testing in selected commodities will benefit the Government. Such testing has been effectively applied in a number of acquisitions. Any testing results should be incorporated into existing product deficiency reporting and feedback systems and be made available to the services' existing systems.

(2) Concur. It is recommended that a quality deficiency report (QDR) be prepared for nonconforming hardware submitted for Government or Government sponsored laboratory testing. Existing corrective action procedures for original equipment manufacturer conducted tests are considered adequate.

1.d. Do not concur. The establishment of selective testing should not be determined solely on the number of QDRs. On site evaluations, previous inspection results, waivers, deviations, RODs and other special quality data should determine actions to be taken.

2. Concur. In view of the subject audit results for Federal Supply Class 1005, the department of Navy will direct contract administration officers to conduct indepth quality assurance verification of contractor and subcontractor material inspection, in plant manufacturing processes, the adequacy of test equipment, and the independence of the contractor quality control function. The Naval Air Systems Command will complete a data review and provide recommendations based on this review for subsequent action by 30 January 1989.

3. & 4. No comments are offered since these recommendations are directed specifically to U.S. Air Force activities.

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC 20330-1000

OFFICE OF THE ASSISTANT SECRETARY

FEB 07 1989

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING
OFFICE OF THE INSPECTOR GENERAL
DEPARTMENT OF DEFENSE

SUBJECT: Draft Report on the Audit of Nonconforming Products in the Defense Supply System at Warner Robins Air Logistics Center (Project 6AC-101)(Your memo, September 29, 1988) - INFORMATION MEMORANDUM

This is in reply to your memorandum for Comptroller of the Air Force requesting comments on the findings and recommendations made in the subject draft report.

The issue of improving the acquisition of spare parts is both timely and appropriate as we face the prospect of maintaining our aging weapon systems with more austere funding. Acquiring quality products to meet the needs of the user, in this case our logistics centers and operational commands, is a top priority of the Air Force. As recognized by your report, several ongoing Air Force, Defense Logistics Agency, and Office of the Secretary of Defense initiatives have been designed to address these important issues. Reducing the incidence and costs associated with unsatisfactory products is an essential and important basis for our efforts under Total Quality Management (TQM).

We are in substantial agreement with your recommendations. However, the evaluation of the nonconformances by Warner Robins, and our ongoing analysis of Material Discrepancy Investigation Reports recently provided by the Contract Administration Offices, indicate significantly different results from those in your draft report on the nature and number of nonconformances. Consequently, we cannot agree with the projections of dollar value or numbers of spare parts with major or minor nonconformances or with all of the recommendations.

The attached detailed analysis (Atch 1) supports your conclusion that there is evidence of nonconforming parts worthy of DOD and contractor management attention. Improvements such as those instituted under TQM are needed in the acquisition process, contractor management of quality, and the DOD Quality Assurance Program, but the magnitude of the problem is far less than the projections in the draft report indicate. There is no valid basis for concluding that a high dollar value of the inventory is nonconforming. The final report should be appropriately modified to clarify the findings and prevent further misunderstandings that a large percentage of the inventory is nonconforming.

We appreciate the opportunity to provide comments while the report is in draft form.

Daniel S. Rak

DANIEL S. RAK
Deputy Assistant Secretary
(Acquisition Management & Policy)

1 Atch
Air Force Comments w/Atch

cc: USD(A)
DLA Q
OASN(S&L)RM&Q
AMCQA

AIR FORCE MANAGEMENT COMMENTS ON DOD IG DRAFT REPORT ON THE AUDIT OF NONCONFORMING PRODUCTS IN THE DEFENSE SUPPLY SYSTEM AT WARNER ROBINS AIR LOGISTICS CENTER (WR-ALC)

(DOD IG Project 6AC-101)

Final Repo
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This paper summarizes the Air Force management comments on the draft of the subject proposed audit report as requested by the Assistant Inspector General for Auditing memorandum, September 29, 1988.

Finding Summary (page 11): "The DOD Quality Assurance Program did not work adequately for the acquisition of spare parts in two Federal Supply Classes and one National Stock Number in the Hardware Federal Supply Group at WR-ALC. Nonstandard terms and definitions for a nonconformance and its degree of magnitude existed. Contractors did not adequately implement stated quality control procedures. In addition, Government quality assurance representatives did not identify and reject the contractors' inadequate quality control practices. Recurring Material Review Board actions occurred without receipt of corrective action plans. The Quality Deficiency Reporting System and a Contractor Responsibility Review Program System provided untimely and very limited information on contractors' prior quality performance. Furthermore, additional contract requirements for conformance testing of essential supply items before source acceptance were not identified in Logistics Center contracts. As a result of the problems identified, about $48.8 million (43.4 percent) of the sample parts had major nonconformances and $55.0 million (48.9 percent) of the sample parts had minor nonconformances to contract specifications, and the Air Force did not receive the quality parts it paid for. The Logistics Center's acquisition and acceptance procedures for spare parts are also used at other Air Force Logistics Centers. Therefore, a similar probability for nonconforming spare parts for like supply classes may exist at other Centers." 7

Air Force Management Comment: We concur that evidence of nonconformance exists; however, we have found that it is not of the magnitude expressed in the draft audit report. WR-ALC has prepared a comprehensive summary sheet of the nonconformances identified in the subject audit and individual summary sheets for each National Stock Number tested showing the initial DOD IG test results, WR-ALC selective retest results, tests conducted in response to the Quality Deficiency Reports (i.e., Material Discrepancy Investigation Reports (MDIRs)), WR-ALC actions taken, and current status/disposition of the items (Atch 1). The results can be briefly summarized as follows:

	DOD IG Finding	WR-ALC Finding	MDIR Finding
Major Nonconformance	11	2	1
Minor Nonconformance	31	10	8
Fully Conforming	4	6	22
Results unavailable*	0	28	15
Total	46	46	46

*MDIR results not available at this time or WR-ALC did not retest.

a. In all but two cases WR-ALC evaluation determined that the items are fully serviceable and released them to the field for "use as is."

b. The MDIRs question the validity of inspection or test conducted for the DOD IG by the independent laboratories. A broad spectrum of reasons for different results are cited in the MDIRs. There are examples where the MDIR indicates that testing by the laboratory misinterpreted data package requirements and no departures from contractual requirements actually exist. In other cases the laboratory used drawing or specifications revisions different from what was actually called out in the contract at the time of manufacture. Our analysis of the MDIRs at WR-ALC is still ongoing. Complete results are expected by March 31, 1989.

b. Since WR-ALC had received only one QDR noted by the DOD IG, they conducted a "user" survey with several operational commands (i.e., TAC, SAC, AFRES, and the ANG). No complaints or problems with the items contained in the audit were identifed.

c. Further, WR-ALC reviewed procurement demand data (Atch 2) relating to the nonconforming items found by the DOD IG and found no indications of a substantial nonconformance problem.

d. The premise that within a sample population valued at $112 Million, $103.8 Million (92.3%) contains either minor or major nonconformances would support the findings that the DOD Quality Assurance Program did not work adequately and that, since the same acquisition and acceptance procedures for spare parts are used at other ALCs, a similar problem for like supply classes may exist at other Centers. However, the statistical approach, findings and projections are not correct.

(1) The sample population is extremely sensitive to a very few key NSNs. FSC 1005 represents 94% of the projected universe items and 98% of the projected universe cost. Sample item number 8 from FSC 1005 reported as nonconforming, represents 83% of the total sample universe within the FSC. A finding of nonconformance with this single item skews findings for the entire audit. The MDIR on this item from one contractor did not substantiate the finding of nonconformance reported by the test laboratory and a test using an appropriate gauge by a second source contractor claims critical dimensions are in conformance with contract specifications.

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Page No.

(2) The statistical procedures used in the draft report are not correct. The statistical procedures used in designing the tests, establishing confidence intervals and extending the test results to the total population assume independence within each individual NSN tested. Test results show that the independence assumption is clearly violated, i.e., a particular part has the same failure predictably repeated.

(3) The method of projecting cost is not correct since it failed to consider the distribution of cost and relationships between the sample NSNs and the NSNs from which the sample was drawn.

Therefore we cannot concur with the findings and projections of the cost or percentage of nonconforming parts. While there is evidence of nonconforming parts worthy of DOD and contractor management attention, the magnitude is overstated by the Draft DOD IG Report. Projections of the cost and number of nonconforming parts in the total population and inferences that similar nonconformances exist throughout the supply system should not be made in the final report.

RECOMMENDATION FOR CORRECTIVE ACTION

Recommendation 1.a (page 38): "Standardize the terminology and definitions for a nonconformance in DOD Guidance. Standardization should occur through the use of one set of terms and definitions for a nonconformance, and will eliminate the nonstandard terms and definitions of the words 'Nonconformance', 'Minor Nonconformance', 'Major Nonconformance', 'Type I Nonconformance', 'Type II Nonconformance', 'Defect', 'Major Defect', and 'Minor Defect' in the Federal Acquisition Regulation and Military Standards." 21

Air Force Management Comment: Concur and will support OSD action on this recommendation.

Recommendation 1.b (page 38): "Issue a joint service regulation for the uniform implementation of the policies in Defense Logistics Agency Regulation 8200.10, 'Control of Nonconforming Material.' Include specific requirements in the regulation for describing nonconformances, the corrective action to be taken, and the responsibility of Government quality assurance representatives for determining that contractors initiate effective corrective actions." 21

Air Force Management Comment: We concur with the objective of this recommendation to issue a joint regulation that will motivate contractors to implement effective corrective action, eliminate the causes of nonconformance and improve manufacturing processes.

SAF/AQC has been working under a charter from the DOD Quality Assurance Council to develop and coordinate such a joint regulation. That effort is complete. Each DOD Component has now approved the regulation and it is ready for publication. The Air Force designation is AFR 74-18 and the regulation will be printed as a joint regulation after each DOD Component provides their respective publication numbers. Their authentication references and printing requirements are due by January 31, 1989. Publication of the joint regulation is planned to be complete by May 31, 1989. Pending publication, The Air Force Contract Management Division, under authority provided by FAR Subpart 46.407, Nonconforming Supplies or Services, has implemented a highly successful nonconformance reduction effort with major Air Force contractors that demonstrates the validity of this approach.

The regulation harmonizes existing contract administration officer authority to obtain consideration when a contractor delivers nonconforming products and, among other guidelines, describes consideration as a tool to motivate contractor reduction of in process nonconformance levels. Specific Government quality assurance representatives responsibilities, such as those cited in the recommendation, are described in existing regulations such as DLAM 8200.1, Procurement Quality Assurance, and AFCMDR 74-1, Quality Assurance Program, and need not be repeated in the joint regulation. The joint regulation addresses the broader responsibilities for quality of all Government contracting and contract administration personnel as part of Total Quality Management.

Recommendation 1.c(1) (page 38): "Incorporate provisions in draft DOD Directive 5000.XX, 'Quality Programs', for a program that will use laboratory testing as a tool for verification that essential spare parts conform with certain preidentified technical specifications before their acceptance and that results will be used in the implementation of a DOD-wide product deficiency reporting and feedback system." 21

Air Force Management Comment: We concur with this recommendation providing "essential spare parts" is stated as "safety critical items". The term "essential" is nebulous in the context of Government contracting. All spare parts acquired should have a specific "essential" requirement. The change will bring this recommendation into agreement with the DOD Action Plan on Counterfeit Material and Unauthorized Product Substitution.

Recommendation 1.c(2) (page 39): "Incorporate provisions in draft DOD Directive 5000.XX, 'Quality Programs', for a program that will require contract administration officers to follow up on the results of laboratory testing and to reevaluate the quality controls applied to the manufacturing process used to produce the nonconforming parts." 21

Air Force Management Comment: We concur providing this is stated as the contract administration office and that the office will follow up to assure contractor corrective action. As stated, this is not an appropriate role for the contract administration officer. The Government's objective, as a purchaser, is to assure the contractor resolves the problem and delivers conforming parts. As stated the task implies an inappropriate intervention by the

Government to manage the contractors manufacturing operation. The Air Force will support OSD action to implement this recommendation as clarified here.

Recommendation 1.d (page 39): "Establish provisions within the Federal Acquisition Regulation that permit the contracting officer to include selective testing requirements in Requests for Proposals and to waive the testing requirements in contract bid proposals for contractors with a documented history of producing quality parts or with less than a specified rate of quality deficiency reports issued against them on other contracts for production of parts in the same Federal Supply Class." 21

Air Force Management Comment: We concur with the objective of this recommendation to make demonstrated differences in contractor performance a factor in the contract award process. However, we find it difficult to rectify the DOD/IG suggested method of waiving test requirements with the premise that we should require only those tests essential to verify the product meets specification. Furthermore, selectively defining and waiving tests in RFPs would create administrative problems. Test requirements subject to waiver would have to be priced separately and listed as separate line items. This would mean identification of these tests in purchase requests, creating additional workload and cost for requirements and contracting personnel without a demonstrated benefit.

An effective way to deal with Contractors that fail to perform satisfactorily is not to require additional product tests, as in the recommendation, but rather to take action to hold contractors responsible for the quality of their products and to make their performance a consideration for future work. This can be accomplished by providing them and their cognizant contract administration office accurate and timely feedback on the quality of their products and by making quality a consideration in the award process. As identified in the draft report Appendix A, improving the timeliness and effectiveness of QDRs and improving methods for contracting officer consideration of quality and other factors in arriving at an award decision are ongoing DOD initiatives to improve quality.

Recommendation 2 (page 39): "We recommend that the Assistant Secretary of the Navy (Shipbuilding and Logistics), the Assistant Secretary of the Air Force (Acquisition), and the Director, Defense Logistics Agency direct contract administration offices to provide support as requested by procurement offices for in-depth verification of contractor quality control practices for the essential characteristics of the spare parts in Federal Supply Class 1005 (guns through 30 millimeters) and for audit sample parts referred for review by the Commander, Warner Robins Air Logistics Center. Specifically, quality assurance verification should include reviews of subcontractor supplied material inspection processes, in-plant manufacturing processes, the adequacy of test equipment, and the independence of the contractors' quality control functions." 21

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Air Force Management Comment: Concur. This action has been initiated by WR-ALC issuing Quality Deficiency Reports on the items found nonconforming. Action is dependent on findings by the cognizant contract administration organization.

Recommendation 3.a (page 40): "We recommend that the Commander, Air Force Logistics Command, improve the consolidation of quality performance data on contractors in the Contractor Responsibility Review Program system. Improvements should include the availability of all Quality Deficiency Reports and other current historical data on contractor quality performance to contracting officers during the acquisition process." 22

Air Force Management Comment: Concur. The Contractor Responsibility Review Program has two data entries concerning contractor quality performance. They are contractor inclusion on the DLA Contractor Alert List, and the numbers of QDRs and material deficiency reports (MDRs). The QDR/MDR data needs to be changed. In lieu of just numbers of QDRs/MDRs, some analysis of the QDRs/MDRs needs to be done and a recommendation made by the quality analyst as to whether further investigation should be made prior to award of a contract to the contractor in question. Generally further investigation means a request for a pre-award survey by the cognizant Contract Administration Office. This analysis and recommendation should come from the Single Point of Contact Office.

Recommendation 3.b (page 40): "We recommend that the Commander, Air Force Logistics Command, establish a post-production inspection and testing program to determine the extent of major nonconformances in essential spare parts. The program should initially include Federal Supply Class 1005 (guns through 30 millimeters)." 22

Air Force Management Comment: We concur with this recommendation providing "essential spare parts" is stated as "safety critical items" and it is reworded as follows: "...institute a coordinated program to identify all safety critical applications in aerospace and missile programs, and determine the feasibility and type of items to be included in destination acceptance inspection." See our management comment on recommendation 1.c(1) above.

Recommendation 4.a (page 40): "We recommend that the Commander, Warner Robins Air Logistics Center, initiate additional testing and inspection requirements in contracts and provide additional mandatory inspection requirements and essential characteristics of parts to contract administration offices for the acquisition of spare parts from the Federal Supply Class 1005 (guns through 30 millimeters)." 22

Air Force Management Comment: Concur with the intent. However, see our management comments on recommendations 1.c(1) and 3.b above.

Recommendation 4.b (page 40): "We recommend that the Commander, Warner Robins Air Logistics Center, provide Quality Deficiency Reports and test results to the cognizant contract administration offices on the nonconformances identified in this audit and in future testing."

Air Force Management Comment: Concur. Warner Robins Air Logistics Center has already accomplished this task for nonconformances identified in the audit and the procedure will be continued on an ongoing basis.

Recommendation 4.c (page 40): "We recommend that the Commander, Warner Robins Air Logistics Center, request contractors that provided the nonconforming parts identified in this report to provide repairs or voluntary refunds for the nonconforming parts, identify how the nonconformances occurred, and report on how quality control practices were modified to prevent future occurrences." 22

Air Force Management Comment: Concur for those parts where we agree that a nonconformance exists and had not previously been accepted through material review procedures. We assume the intent of the DOD IG recommendation was for repairs to be made at no cost to the Government. It should be noted that DOD policy on voluntary refunds (see DOD Federal Acquisition Regulation Supplement Subpart 242.71, Voluntary Refunds) requires that voluntary refunds in most cases are to be requested after it has been determined that no contractual remedy is readily available.

2 Atch *
1. WR-ALC List of IG Nonconformance, Jan 26, 1989, w/Atch
2. WR-ALC Procurement Demand Data

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* These 2 attachments were not included in the Air Force's comments because of their length (49 pages). We synopsized the information from the attachments in Appendix P and included our audit response to the information in the attachments.

DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

IN REPLY REFER TO DLA-CI

6 FEB 1989

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING,
DEPARTMENT OF DEFENSE

SUBJECT: Draft Report on the Audit of Nonconforming Products in the Defense Supply System at Warner Robins Air Logistics Center (Project No. 6AC-101)

We have completed the review of the subject audit report and have discussed details of our findings with your staff. We agree with the draft report conclusion that some nonconforming products are getting into the DoD supply system. However, our evaluation of the items identified in your report as nonconforming, did not substantiate your laboratory findings. Further, our analyses reveal the problem to be less significant than projections made in the draft report.

The basis for the foregoing is as follows:

a. The sample size (46 NSNs) used was too small to support the population projections and conclusions.

b. We could substantiate only 8 of the 37 items under DLA cognizance identified as nonconforming by the IG.

Again, these inconsistencies and our findings and conclusions are not intended to downplay the concern of this Agency towards the nonconforming supply issue. There is no question that nonconformance in any degree is unacceptable. Defense Logistics Agency employees are vigilant to identify both need and opportunity to improve our procurement, storage and issue, and contract oversight processes. Our total quality commitment, enhanced by the focus provided by your audit thrust, will help improve the vital processes oriented to our primary objectives -- customer satisfaction and the improved material readiness of our Armed Forces.

FOR THE DIRECTOR:

William J. Cassell

WILLIAM J. CASSELL
Comptroller
Defense Logistics Agency

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TYPE OF REPORT: AUDIT DATE OF POSITION: 4 Feb 89

PURPOSE OF INPUT: INITIAL POSITION

AUDIT TITLE AND NUMBER: Audit of Nonconforming Products in the Defense Supply System at Warner Robins Air Logistics Center (Project 6AC-101)

FINDING: The DoD Quality Assurance Program did not work adequately for the acquisition of spare parts in two Federal Supply Classes and one National Stock Number in the Hardware Federal Supply Group at Warner Robins Air Logistics Center (the Logistics Center). Nonstandard terms and definitions for a nonconformance and its degree of magnitude created confusion. Contractors did not adequately implement stated quality control procedures. In addition, Government quality assurance representatives did not identify and reject the contractors' inadequate quality control practices. Recurring Material Review Board actions occurred without receipt of corrective action plans. The Quality Deficiency Reporting System and a Contractor Responsibility Review Program system provided untimely and very limited information on contractors' prior quality performance. Furthermore, additional contract requirements for conformance testing of essential supply items before source acceptance were not identified in Logistics Center contracts. As a result of the problems identified, about $48.8 million (43.4 percent) of the sample parts had major nonconformances to contract specifications, and the Air Force did not receive the quality parts it paid for. The Logistics Center's acquisition and acceptance procedures for spare parts are also used at other Air Force Logistics Centers. Therefore, a similar probability for nonconforming spare parts for like supply classes may exist at other Centers.

DLA COMMENT: Concur in part.

Although DLA concurs in part that the conditions identified in the finding existed at the time of the audit, the magnitude of the problem is considerably less than the projections developed in the course of the investigation. The rationale for this conclusion is:

a. The IG modified its statistical approach in the course of the investigation as a result of fiscal constraints and based its projections on an extremely small sample size. DLA's analysis indicates that :

(1) The sample population is extremely sensitive to a very few key NSNs. For example, FSC 1005 represents 94% of the projected universe of items and 98% of the projected universe cost. Within FSC 1005, sample #8 represents 83% of the sample universe. A finding of nonconformance with this NSN skewed the findings of the entire audit.

(2) The sample size actually selected in the course of the audit (46 NSNs) was substantially lower than the sample size originally planned and required (186 NSNs).

(3) The samples selected for testing were not always representative of the FSC population from which they were chosen.

b. A DLA review of the IG findings of nonconformance revealed that there was a significant difference between DLA and the IG in the number of items identified as being nonconforming. Using the Product Quality Deficiency Reports (PODR) system to investigate and analyze the nonconformances identified by the IG, DLA could substantiate only 22% of the 37 items under DLA cognizance to be nonconforming. On 10% of the items, conformance or nonconformance could not be determined. It appears that the disparity between the IG and DLA findings stem from communication problems and disconnects that led to the failure to use test procedures or standard manufacturing procedures identified in the contract specifications; use required dimensions vice reference dimensions; use drawing revisions in force when items were produced; use required test gage for testing.

Because of the inaccuracies resulting from the IG's sampling approach, and the disparities in the findings of nonconformance, DLA believes that in the final report, DLA validated findings should be used and population projections based on statistical samples should be avoided. DLA feels that the Quality Assurance initiatives in progress and recognized in the Draft audit report in conjunction with the focus provided by the IG recommendations will work at reducing the amount of nonconforming material entering the supply system.

MONETARY BENEFITS: None.
DLA COMMENTS:
ESTIMATED REALIZATION DATE:
ACTUAL AMOUNT REALIZED:
DATE REALIZED:

ACTION OFFICER: LCDR Baldwin, DLA-OO, 46827

DLA APPROVAL: Donald B. Shycoff

TYPE OF REPORT: AUDIT DATE OF POSITION: 4 Feb 89

PURPOSE OF INPUT: INITIAL POSITION

AUDIT TITLE AND NUMBER: Audit of Nonconforming Products in the Defense Supply System at Warner Robins Air Logistics Center (Project No. 6AC-101)

RECOMMENDATION NUMBER 2: We recommend that the Assistant Secretary of the Navy (Shipbuilding and Logistics), the Assistant Secretary of the Air Force (Acquisition), and the Director, Defense Logistics Agency, direct contract administration offices to provide support as requested by procurement offices for in-depth verification of contractor quality control practices for the essential characteristics of the spare parts in Federal Supply Class 1005 (guns through 30 millimeters) and for audit sample parts referred for review by the Commander, Warner Robins Air Logistics Center. Specifically, quality assurance verification should include reviews of subcontractor supplied material inspection processes, in-plant manufacturing processes, the adequacy of test equipment, and the independence of the contractors' quality control functions.

DLA COMMENT: Concur with recommendation.

Special emphasis has been placed on the quality control practices associated with FSC 1005 through comprehensive investigations and analyses of the items through DLA's Product Quality Deficiency Reporting system. For those nonconformances validated, added emphasis and needed corrective action have been incorporated. With the added focus provided by the IG audit findings and recommendations, DLA will continue to refine its current policy and procedures to minimize recurrences of nonconformance by providing an in-depth verification of contractor quality control practices. DLAM 8200.1, a joint service document, identifies the requirements for the Quality Assurance Representatives (QAR) and Defense Contract Administration System (DCAS) for identifying and correcting nonconformances in parts procured by the DoD. This document provides the guidelines and definitions that enable the QARs and the DCAS to provide support to procurement offices for verification of contractors' quality control practices. Special emphasis has also been directed at prime control over subcontractors. Additional policy guidance and direction has been issued through Quality Technical Information Papers (Q-TIPS) issued by DLA dealing with such issues as contractor-subcontractor quality control, Prime Contractor and Subcontractor meetings, direct shipments for Subcontractor Facilities, Material Certifications and Inspection/Tests Reports, Subcontractor Statements of Quality, Government Contract Quality Assurance (CAQ) at subcontract level, Subcontractor Statement of Quality, and Prime Contractor Control of Subcontracted Material. Additional initiatives that will enhance DLA's Quality Assurance Program and the professionalism of its QAR include a review and follow up of all prime contractors with a MIL-Q-9858A Quality Program, reevaluation of Quality Assurance Technical Development Program (QATDP), expanded use of independent test labs, reemphasis of waiver and deviation reduction efforts, reassessment of the Contractor Quality Assurance Program (CQAP), and an assessment of the Product Quality Audit Program at Depots. Additional guidance to QARs in the field has been incorporated into a redesign of the basic

Contract Quality Assurance course (S01) aimed at refining and improving the CAR approach to quality in the field.

DISPOSITION:
( ) Action is ongoing.
(X) Action is considered complete.

MONETARY BENEFITS: None.
DLA COMMENTS:
ESTIMATED REALIZATION DATE:
ACTUAL AMOUNT REALIZED:
DATE REALIZED:

ACTION OFFICER: LCDR Baldwin, DLA-OO, 46827

DLA APPROVAL: Donald B. Shycoff

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS

Attached to the Air Force's response was a summary conclusion page that categorized the conclusions of the Material Deficiency Investigation Report (MDIR) and the Warner Robins Air Logistics Center (the Logistics Center) on whether each sample part was a major nonconformance, minor nonconformance, or conforming. A summary conclusion was not provided for the results of the MDIR for 17 sample parts, and a summary conclusion was not provided for the Logistics Center's conclusion for 28 sample parts. The summary conclusions were supported by a page of information for each sample part that showed the test results of the Inspector General, DoD; the Logistics Center's test results; the MDIR results; the history of the Logistics Center's actions; and the Air Force's current status on actions to be taken. From the information provided to us formally by the Air Force and from the actual MDIR's provided to us informally by the Defense Logistics Agency and the Navy, we summarized the MDIR results and the Logistics Center's conclusion on each sample part and provided an audit response. The Air Force also provided recent data on usage for each sample part. We have included a summary of the usage data on page 27 of this appendix along with an audit response.

Sample Number: 1
National Stock Number: 1005-01-120-2279.
Nomenclature: Track, fixed forward.

MDIR Results: Dimensional nonconformances were verified but were previously reviewed by Material Review Boards. The material variations were due to a product improvement engineering change. The contractor maintained that the supplied parts conformed to drawing material requirements at the time of manufacture. Dimensional variations were totally serviceable with no adverse effect on performance or reliability.

Auditors' Response to the MDIR: There is some doubt on whether 238 of the parts supplied by the contractor were conforming at the time of manufacture. The product improvement change was recorded in May 1983. To reflect the price of the improved material, in June 1983, the price of the track increased on the next order for 31 tracks from $55 each to $104 each. The contractor delivered tracks made of the old material against this order. The next order for tracks was in June 1984. The price for 20 tracks was $84 each. These tracks were made of conforming material. The next order was placed in July 1984 for 12 more tracks. The price was $93 each. The July order was filled with tracks made of nonconforming material. Similarly, an order was placed in August 1984 for 226 tracks at $84 each. The August order was filled with tracks of nonconforming material. In total, General Electric supplied 241 tracks from carryover stock manufactured before the May 1983 product improvement. In our opinion, the MDIR results are inaccurate.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

The Logistics Center's Conclusion: The nonconforming material composition will result in a minimal service-life reduction. Although a minor nonconformance existed, the parts were fully serviceable with either material.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion. The Logistics Center's determination that this part's nonconformance was minor was based on whether the part was serviceable. We contended that it is not minor because the contract administration office should have rejected the part at the increased price. The contracting officer clearly contracted for parts made of the improved material and agreed to pay a higher price for the part. The nonconforming material identified in the audit was not as durable as the improved material. A combination of weaker material content and minor dimensional nonconformances further reduced durability. The overall adverse effect on durability constituted a major nonconformance.

Sample Number: 2
National Stock Number: 1005-00-739-4190.
Nomenclature: Gear spacer.

MDIR Results: The contractor was no longer in business, and no feedback was provided.

Auditors' Response to the MDIR: We agreed with the MDIR results that the contract was not in business.

The Logistics Center's Conclusion: Logistics Center's engineers determined that the hardness nonconformance was a minor nonconformance.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion.

Sample Number: 3
National Stock Number: 1005-01-121-3716.
Nomenclature: Transfer unit.

MDIR Results: Dimensional nonconformance was confirmed on one component that was examined.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the MDIR: We agreed with the MDIR results.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion stated that the parts conformed. However, the Logistics Center's status report as of January 5, 1989, attached to the summary conclusion of its audit response, showed the parts as minor nonconformance.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the parts conformed. In the summary conclusion, the Logistics Center did not recognize the confirmed dimensional nonconformance reported in the MDIR.

Sample Number: 4
National Stock Number: 1005-00-213-7822.
Nomenclature: Gun end.

MDIR Results: There were no requirements for marking the individual piece parts, as asserted by Logistics Center's engineers.

Auditors' Response to the MDIR: We agreed with the MDIR conclusion.

The Logistics Center's Conclusion: The parts fully conformed.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion.

Sample Number: 5
National Stock Number: 1005-00-893-8231.
Nomenclature: Scoop shaft assembly.

MDIR Results: Two separate MDIR's were prepared for two different contractors. Dimensional nonconformances were confirmed for the parts that the first contractor produced. Hardness nonconformances were verified for parts that the second contractor produced.

Auditors' Response to the MDIR: We agreed with the MDIR results.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

The Logistics Center's Conclusion: Assets in stock were returned to the first contractor for replacement; thus, a major nonconformance existed. The second contractor was no longer in business. The dimensional nonconformances attributed to the second contractor were determined to be major nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion of major nonconformances.

Sample Number: 6
National Stock Number: 1005-01-130-6812.
Nomenclature: Aft structure assembly.

MDIR Results: All dimensions were found to conform and the chemical composition of the rivets conformed.

Auditors' Response to the MDIR: During the validation phase of the audit, we determined that the dimensional test results obtained from one independent laboratory were probably not valid for this sample. We communicated this determination to the Logistics Center's officials. However, physical test results performed by a second laboratory in May 1988 indicated that there were parts with a crack and an elongation. These second test results should have been the subject of the MDIR instead of the invalid test results. After reviewing the MDIR in January 1989, we realized the error and sent another copy of the second test results to the Logistics Center. The Logistics Center should have used the May 1988 test results for its deficiency report. Because the test results from the second laboratory were not included in the MDIR, the MDIR results were incomplete.

The Logistics Center's Conclusion: The parts fully conformed.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion. There was evidence that subparts in the aft structure may have contained a crack and an elongation. The Logistics Center did not address these test results in its comments to the draft report. Until we know for sure that the crack actually existed, we are classifying the nonconformances as minor. If the crack is verified, the nonconformance would be upgraded to a major nonconformance.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Sample Number: 7
National Stock Number: 1005-00-276-7831.
Nomenclature: Sprocket assembly.

MDIR Results: A hardness nonconformance was not verified. The hardness specifications on the drawing did not apply to some heat affected zones on the part.

Auditors' Response to the MDIR: All five parts tested failed to meet stated contract requirements for hardness. Also, the finished part did not met the hardness specification stated on the drawing. Consequently, we believed that the MDIR results were inaccurate.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion stated that the test results were unavailable.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. Sufficient data were provided to determine that minor nonconformances existed and engineering changes were needed to make the drawing requirements for hardness clear and specific.

Sample Number: 8
National Stock Number: 1005-00-056-5837.
Nomenclature: Retainer partition.

MDIR Results: Two MDIR's were prepared on parts that were supplied by two separate contractors. The parts that one contractor supplied were held to be conforming because the contractor used an approved gauge to test the parts. The parts that the second contractor supplied were determined to be a material deficiency.

Auditors' Response to the MDIR: We disagreed that parts were conforming for the first contractor. During the audit, an engineer from the Office of the Inspector General, DoD, evaluated the gauge used to measure the dimensions. The gauge could not measure all the critical dimensions for the part. An independent laboratory and the Logistics Center measured the dimensions and determined that the parts nonconformed in both tests. We agreed that the parts supplied by the second contractor were a major nonconformance.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

The Logistics Center's Conclusion: The parts were determined to contain major nonconformances. An investigation was in progress for parts supplied by the first contractor under contract F09603-84-C-3627. All the shelf stock supplied by the second contractor under contract F09603-85-C-4189 was removed from inventory.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion that the parts contained major nonconformances. In an effort to reverify the Logistics Center's retest results, in January 1989, we requested another retest of retainer partitions from contract F09603-84-C-3627. A Logistics Center official informed us that all parts under contracts F09603-84-C-3627 and F09603-85-C-4189 were already removed from inventory stock.

Sample Number: 9
National Stock Number: 1005-00-275-5798.
Nomenclature: Shaft shoulder.

MDIR Results: Two separate MDIR's were prepared for two different contractors. Dimensional nonconformances were confirmed for parts that were produced by the first contractor, but parts from a second contractor were found to conform fully.

Auditors' Response to the MDIR: An independent laboratory and the Logistics Center performed retests that confirmed dimensional nonconformances from both contractors. Consequently, we agreed with the MDIR results for the first contractor, but disagreed with the inaccurate MDIR results for the second contractor.

The Logistics Center's Conclusion: The Logistics Center concluded that the parts conformed.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion. This conclusion contradicted the Logistics Center's retests that showed two parts contained dimensional nonconformances. Initial test results and retest results by independent laboratories also confirmed the existence of dimensional nonconformances. The preponderance of evidence indicated that some parts contained minor dimensional nonconformances and the Logistics Center relied on inaccurate MDIR data for its conclusion.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Sample Number: 10
National Stock Number: 1005-00-116-4703.
Nomenclature: Rod, extension.

MDIR Results: All parts inspected conformed to contract specifications.

Auditors' Response to the MDIR: We agreed with the MDIR results. However, the Logistics Center knew the material totally conformed before the Material Deficiency Investigation was initiated.

The Logistics Center's Conclusion: All parts conformed to contract specifications.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion. The Logistics Center's retest results previously showed that the parts totally conformed. However, we did not agree with the Logistics Center's decision to initiate a Material Deficiency Investigation on parts that were previously determined to be conforming by both the Logistics Center and the auditors.

Sample Number: 11
National Stock Number: 1005-00-921-5120.
Nomenclature: Shaft.

MDIR Results: The dimensional nonconformance was not confirmed. One dimension was examined during the investigation and determined to be a nonfunctional "reference" dimension.

Auditors' Response to the MDIR: We agreed that strict conformance to reference dimensions was not required, but the decision to include a reference dimension as a critical dimension for testing was made by the Logistics Center's engineers. However, the MDIR investigation was incomplete because laboratory test results also indicated other dimensional nonconformances. These dimensional nonconformances were not investigated. Thus, we believed that the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed the part as fully servicaable.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the Logistics Center's Conclusion: We disagreed that test results were unavailable. There was no evidence to refute the initial test results, and there was adequate evidence to conclude that the parts contained minor nonconformances. Because the independent test results indicated dimensional nonconformances, we believed the parts contained minor nonconformances.

Sample Number: 12
National Stock Number: 1005-00-100-4106.
Nomenclature: Coil assembly.

MDIR Results: The dimensional nonconformance was not confirmed.

Auditors' Response to the MDIR: We agreed with the MDIR results because the nonconforming dimension was a reference dimension that need not strictly conform to drawing specifications. However, it should be noted that the Logistics Center's engineers included a reference dimension as a critical dimension for testing by independent laboratories.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed the parts as conforming.

Auditors' Response to the Logistics Center's Conclusion: We disagreed that test results were unavailable. There was adequate information available from independent laboratory tests to conclude that the parts were conforming.

Sample Number: 13
National Stock Number: 1005-00-928-5189.
Nomenclature: Link, loader mounting.

MDIR Results: The burrs in the holes were apparently caused by an excess of anodize coating, which was easily flaked off the parts. The dimensional nonconformances were not confirmed.

Auditors' Response to the MDIR: We disagreed that the excess material was anodize coating. An engineer from the Office of the Inspector General, DoD, inspected the parts and determined that the excess material was metallic. The MDIR was inaccurate.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the parts contained minor nonconformances. However, the Logistics Center's status report as of January 5, 1989, showed that the parts conformed to contract specifications.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion indicating a minor nonconformance, but we disagreed with the status report conclusion indicating that the parts conformed. Samples examined during the MDIR review contained nonconforming burrs of metallic material in the link loader holes. The independent laboratories reported that the burrs caused dimensional nonconformances.

Sample Number: 14
National Stock Number: 1005-00-050-1979.
Nomenclature: Modular assembly.

MDIR Results: A circuit board with the nonconforming electronic component (a resistor) was not provided to the contractor for verification of nonconformance. Thus, the nonconformance could not be confirmed.

Auditors' Response to the MDIR: The nonconforming components were not retested; therefore, the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. However, the Logistics Center's status report as of January 5, 1989, showed that the parts had minor nonconformances and were fully serviceable.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. Test results provided by the Defense Electronic Supply Center showed that a minor nonconformance existed, and no other data existed to refute this conclusion.

Sample Number: 15
National Stock Number: 1005-00-383-1102.
Nomenclature: Support assembly.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

MDIR Results: The major nonconformances attributable to dimensional and hardness nonconformances were not verified. However, some minor dimensional nonconformances were verified.

Auditors' Response to the MDIR: We agreed with the MDIR results.

The Logistics Center's Conclusion: The Logistics Center determined that the parts contained minor dimensional nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion of classifying the parts as minor nonconformances.

Sample Number: 16
National Stock Number: 1005-01-125-5229.
Nomenclature: Shaft shouldered.

MDIR Results: One minor dimensional nonconformance was not confirmed. However, another minor dimensional nonconformance (a slight taper in the spline portion of the shaft) was determined to exist. The contractor implemented a planning change to prevent the nonconformance from recurring.

Auditors' Response to the MDIR: We agreed with the MDIR results indicating a minor dimensional nonconformance.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. However, the Logistics Center's status report as of January 5, 1989, showed that the parts contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. We agreed with the Logistics Center's status report as of January 5, 1989, that indicated minor nonconformances existed as reported in the MDIR. The contractor's implementation of a planning change to prevent recurrence of the nonconformances demonstrated acknowledgment of a manufacturing weakness. Consequently, we believed that the samples contained minor nonconformances.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Sample Number: 17
National Stock Number: 1005-00-923-9719.
Nomenclature: Cover.

MDIR Results: Retests performed by laboratories for the contractor did not substantiate a material composition nonconformance. The contractor confirmed some dimensional nonconformances.

Auditors' Response to the MDIR: The results of the independent laboratory tests, retests, and tests made during the MDIR review confirmed that parts contained dimensional nonconformances. The cumulative result of these nonconformances was a degradation of the durability of the parts. Because the durability of the part was reduced, a major nonconformance existed. Also, the absence of identifying numerous dimensional nonconformances during the MDIR review indicated that the parts the contractor tested may not be from the same production lots as the parts used in the laboratory's and Logistics Center's tests. Thus, we believed that the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center determined that the dimensional nonconformances constituted a minor nonconformance.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion. The results of testing conducted by two independent laboratories and by the Logistics Center showed multiple dimensional nonconformances. These multiple nonconformances would adversely affect the durability of the part. The contractor should not have offered the parts to the Government, and the Government Quality Assurance Representative should not have accepted the parts. This conclusion was provided by two different Logistics Center engineers and an engineer from the Office of the Inspector General, DoD. Thus, the part contained major nonconformances.

Sample Number: 18
National Stock Number: 1005-01-055-3371.
Nomenclature: Guide, element.

MDIR Results: The contractor did not verify dimensional nonconformances when the sample was measured on a specifically designed test fixture. The presence of a crack was found during a magnetic particle inspection. The contractor characterized the crack as a blemish.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the MDIR: We agreed with the MDIR results that indicated the parts conformed dimensionally. However, we maintained that one part contained a crack. The presence of a crack in one part represented a major nonconformance with that one part. The crack was confirmed by independent laboratories and the contractor's own on-site quality control personnel during our visit to the contractor's facility. Consequently, we believed that the MDIR conclusions were inaccurate.

The Logistics Center's Conclusion: The Logistics Center subjected available stock to tests and the test results did not confirm nonconformances. The Logistics Center concluded that all parts conformed to contract specifications.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's conclusion that all parts conformed. The Logistics Center did not take into consideration the MDIR results, which showed that a contractor confirmed the crack in one part that was tested. A major nonconformance resulted because one part was cracked.

Sample Number: 19
National Stock Number: 1005-00-449-2426.
Nomenclature: Chuting/50-caliber.

MDIR Results: The contractor stated that the parts conformed to the catalog requirements as specified in the contract. Although the contractor did not confirm dimensional nonconformances, the contractor noted that the link material was extremely flexible and dimensional differences could have been caused by packaging and shipping.

Auditors' Response to the MDIR: Although the parts conformed to the catalog requirements, the parts did not conform to the drawing requirements. We agreed that the dimensional nonconformances were not a result of inadequate contractor quality control. The nonconformances occurred because of inadequate contracting procedures. We also believed that the quality assurance representative should have researched the specifications differences between the catalog and drawing requirements. Consequently, we believed that the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center concluded that the dimensional nonconformances constituted a minor nonconformance.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion of a minor nonconformance. Numerous dimensional nonconformances were found during testing by two independent laboratories and by the Logistics Center. Two different Logistics Center engineers concluded that the nonconformances could adversely affect the performance of the part. Therefore, we classified the part as a major nonconformance.

Sample Number: 30
National Stock Number: 3130-00-355-2794.
Nomenclature: Housing bearing.

MDIR Results: The Naval Plant Representative Office at McDonnell Douglas Corporation prepared a report that acknowledged the existence of nonconformances on this part.

Auditor's Response to the MDIR: We agreed with the MDIR results that indicated a minor nonconformance.

The Logistics Center's Conclusion: This part had a minor nonconformance because the undersize holes were pilot holes that will be drilled during installation at the Air Force base.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's summary conclusion that the nonconformances were minor. However, the more significant nonconformances were not pilot holes. The minor nonconformances that we reported were associated with other specified dimensions that were corrected with an engineering change order because of our review.

Sample Number: 31
National Stock Number: 3130-00-056-3084.
Nomenclature: Cap assembly.

MDIR Results: The Naval Plant Representative Office, Stratford, Connecticut, reported that the cap assembly was never received by the contractor and the action was closed as of January 31, 1989.

Auditors' Response to the MDIR: We have no response since no actions were accomplished to test the parts at the contractor's facility.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

The Logistics Center's Conclusion: The Logistics Center conducted testing that confirmed the existence of minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We agreed with the Logistics Center's determination of minor nonconformances.

Sample Number: 32
National Stock Number: 3130-00-941-1375.
Nomenclature: Hinge assembly.

MDIR Results: The contractor admitted the existence of the nonconformances, but the contractor stated that the nonconformances would have no effect on the part.

Auditors' Response to the MDIR: We agreed with the contractor that this part contained minor nonconformances.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. However, the Logistics Center's status report as of January 5, 1989, classified the part as a minor nonconformance.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The contractor agreed with the nonconformance and test results supported the conclusion of a minor nonconformance.

Sample Number: 33
National Stock Number: 3130-00-523-5540.
Nomenclature: Bearing assembly.

MDIR Results: The contractor stated that deficiencies did not exist. However, the contractor acknowledged that parts with undersized diameters were accepted by the Defense Contract Administration Services representative through a Material Review Board action.

Auditors' Response to the MDIR: Some tested parts in our sample were found to have undersized outer diameters, which would be a minor nonconformance. These nonconformances were similar to some parts that were accepted through Material Review Board procedures. Therefore, we believed that sufficient evidence

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

existed to substantiate a minor nonconformance and that the results of the MDIR were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. However, the Logistics Center's status report as of January 5, 1989, showed that the Quality Deficiency Report was closed as of December 2, 1988, and that the parts were fully serviceable.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. Results of the original independent laboratory tests, the retests, and the contractor's acknowledgment that the parts were submitted to Material Review Boards for approval clearly showed that the parts had minor nonconformances. (By definition, only minor nonconforming material is submitted for the Material Review Board's approval.)

Sample Number: 34
National Stock Number: 3130-00-110-7202.
Nomenclature: Block bearing.

MDIR Results: The contractor did not confirm material composition deficiencies.

Auditors' Response to the MDIR: We agreed that no material composition deficiencies existed. This fact was confirmed during independent laboratory retests. However, the MDIR did not address some multiple dimensional nonconformances. Thus, we believed that the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that test results were unavailable. However, the Logistics Center's status report as of January 5, 1989, showed the part contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We agreed that minor dimensional nonconformances existed. However, the Logistics Center should not have initiated a Material Deficiency Investigation based on material composition for this part because retest results showed that the part conformed to material specifications. We disagreed with the Logistics Center's summary conclusion that the results were unavailable. No data existed to refute the independent laboratory test results that showed minor dimensional nonconformances.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Sample Number: 35
National Stock Number: 3130-00-938-0953.
Nomenclature: Bearing assembly.

MDIR Results: A bearing assembly was shipped to the contractor and the investigation was in process.

Auditors' Response to the MDIR: We did not respond to the MDIR results because the results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed that the item was obsolete and will not be reordered.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. No data existed to refute the test results that showed minor dimensional nonconformances.

Sample Number: 36
National Stock Number: 3130-00-056-5988.
Nomenclature: Housing bearing.

MDIR Results: The Naval Plant Representative Office, Stratford, Connecticut, reported that the housing bearing was never received by the contractor and that the action was closed as of January 30, 1989.

Auditors' Response to the MDIR: We did not respond because no actions were accomplished to test the parts at the contractor's facility.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that test results were unavailable.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that test results were unavailable. Laboratory test results showed a minor nonconformance in one of five parts.

Sample Number: 37
National Stock Number: 3130-00-296-4598.
Nomenclature: Plate, retaining, bearing.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

MDIR Results: Two of the six deficient parameters identified in the independent laboratory test reports were consistently out of tolerance and had deficient surface finishes. The contractor examined on-hand stock, identified 42 defective parts, and scrapped the parts.

Auditors' Response to the MDIR: We agreed with the MDIR results.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the parts contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's conclusion. The Logistics Center did not acknowledge the MDIR, dated October 5, 1988, that stated the contractor agreed to rework or replace all defective units and scrapped 42 on-hand defective items. The parts should have been categorized as major nonconformances.

Sample Number: 38
National Stock Number: 3130-00-909-8721.
Nomenclature: Housing assembly.

MDIR Results: The housing assemblies were shipped to the contractor and the investigation was in progress.

Auditors' Response to the MDIR: We did not respond because the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. However, the Logistics Center's status report as of January 5, 1989, showed that the parts contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. Independent laboratory test results showed that the parts contained minor dimensional nonconformances.

Sample Number: 39
National Stock Number: 3130-01-142-0742.
Nomenclature: Ring.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

MDIR Results: All dimensions were found to conform. The contractor disagreed with the auditors' findings.

Auditors' Response to the MDIR: Independent laboratory test results on two samples indicated that one sample was conforming and one sample was nonconforming. We had no assurance that the ring that was provided to the contractor for the Material Deficiency Investigation was the same ring with the nonconformances. Consequently, we accepted the MDIR results, but maintained that one sample was nonconforming.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that test results were unavailable. However, the Logistics Center's status report as of January 5, 1989, showed the part as conforming.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. Our discussions with Logistics Center officials disclosed that the rings shipped to the contractors were not the rings from our sample. We had no assurance that the ring used in the Material Deficiency Investigation was the same ring identified as nonconforming by the independent laboratory. Therefore, we had no sound basis for changing the ring's classification from a minor nonconformance to conformance.

Sample Number: 80
National Stock Number: 5120-00-309-7249.
Nomenclature: Bolt puller.

MDIR Results: The contractor stated that undersizing a press fit hole was standard industry practice. The contractor did not agree with the finding of a minor nonconformance.

Auditors' Response to the MDIR: The dimension in question did not meet the contract requirements specified by the drawing. Further, the Logistics Center's engineers identified the dimension as critical. We believed that this constituted a nonconformance and that the MDIR results were inaccurate.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed that the parts contained minor nonconformances.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. There was sufficient test evidence to conclude that the part contained a minor nonconformance. The nonconformance was due to an unnecessarily rigid drawing specification that did not take into account standard industry practice. An engineering change to lessen the tolerances may be appropriate.

Sample Number: 81
National Stock Number: 5120-00-849-9573.
Nomenclature: Socket wrench.

MDIR Results: The contractor did not confirm the dimensional nonconformances.

Auditors' Response to the MDIR: The MDIR results were incomplete. The contractor verified dimensions, but no verifications of reported hardness nonconformances were attempted. Additionally, no checks were made to ensure that MDIR samples contained the required identification. Finally, the contractor's dimensional checks were made on a different socket wrench than the socket wrench used in the original tests because all socket wrenches were consumed during the original tests.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed that the parts contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The original independent laboratory test results showed several minor nonconformances.

Sample Number: 82
National Stock Number: 5120-01-102-8987.
Nomenclature: Jaw, lower.

MDIR Results: A lower jaw tool was shipped to the contractor and the investigation was in progress.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the MDIR: We did not respond because the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed that the parts contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The original laboratory test results showed minor nonconformances.

Sample Number: 83
National Stock Number: 5120-01-121-5715.
Nomenclature: Driver tool.

MDIR Results: No defects were found.

Auditors' Response to the MDIR: We agreed with the MDIR results.

The Logistics Center's Conclusion: The Logistics Center concluded that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed that the part was fully conforming.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. We did agree that the part fully conformed.

Sample Number: 84
National Stock Number: 5120-00-758-1487.
Nomenclature: Tool remover.

MDIR Results: No defects were confirmed. The contractor nonconcurred with a manufacturing nonconformance.

Auditors' Response to the MDIR: Of the 10 parts selected and tested, 5 contained minor dimensional nonconformances. One of the nonconformances was confirmed by the contractor during our visit to the contractor's facility. Due to the flexibility of these parts, the nonconformances may have occurred after the

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

manufacturing process. We believed that the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center concluded that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed the part was fully conforming.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's conclusion that the test results were unavailable. During the audit, we verified a nonconformance with the contractor in a visit to the contractor's facility.

Sample Number: 85
National Stock Number: 5120-01-102-6179.
Nomenclature: Wrench body.

MDIR Results: A wrench was shipped to the contractor and the investigation was still in progress.

Auditors' Response to the MDIR: We did not respond because the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The independent laboratory test results showed material composition nonconformances. The Logistics Center's engineers categorized the nonconformances from the laboratory tests as minor nonconformances.

Sample Number: 86
National Stock Number: 5120-00-421-0435.
Nomenclature: Hand tool.

An independent laboratory did not test this part. Functional tests of the tool by the Logistics Center's engineers showed that the part functioned satisfactorily.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Sample Number: 87
National Stock Number: 5120-00-386-6567.
Nomenclature: Socket wrench.

MDIR Results: The contractor confirmed that markings were not applied as required by the drawing. The unapplied markings were a minor nonconformance.

Auditors' Response to the MDIR: We agreed with the MDIR results.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed the part as a minor nonconformance. The Logistics Center requested a refund from the contractor.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's conclusion that the test results were unavailable. Initial test results showed a minor nonconformance and the contractor acknowledged the minor nonconformance for required markings.

Sample Number: 88
National Stock Number: 5120-01-134-2876.
Nomenclature: Wrench.

MDIR Results: A wrench was sent to the contractor and the investigation was in progress.

Auditors' Response to the MDIR: We did not respond because the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. No evidence existed to refute the independent laboratory test results that showed minor nonconformances.

Sample Number: 89
National Stock Number: 5120-01-191-1875.
Nomenclature: Riveter button.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Sample Number: VS-2
National Stock Number: 5306-00-356-2619.
Nomenclature: Screw.

MDIR Results: Some screws were shipped to the contractor and the investigation was in progress.

Auditors' Response to the MDIR: We did not respond because the MDIR results were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report, as of January 5, 1989, showed that the parts contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the results of testing were unavailable. No data existed to refute the independent laboratory's test results that showed minor dimensional nonconformances.

Sample Number: VS-3
National Stock Number: 5306-00-235-6233.
Nomenclature: Bolt.

MDIR Results: No investigation was initiated because the parts were fully conforming.

Auditors' Response to the MDIR: We did not respond because there was no investigation.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status as of January 5, 1989, showed that the part was fully conforming.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The independent laboratory test results showed that the part fully conformed.

Sample Number: VS-4
National Stock Number: 5307-00-169-8687.
Nomenclature: Stud.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

MDIR Result: No investigation was initiated because the parts were fully conforming.

Auditors' Response to the MDIR: We did not respond because there was no investigation.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The laboratory test results showed that the part fully conformed.

Sample Number: VS-1
National Stock Number: 5306-00-489-1333.
Nomenclature: Bolt.

MDIR Results: The contractor nonconcurred with the auditors' findings. The MDIR results indicated that the contractor stated that all bolts delivered contained a required chamfer. The investigation was still in progress.

Auditors' Response to the MDIR: The preliminary MDIR results were contrary to the independent laboratory test results and to the facts developed during the audit team's visit to the contractor's plant. At that time, the contractor acknowledged that the bolts did not have a chamfer. The MDIR was inaccurate.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion reflected a minor nonconformance. The Logistics Center's status report as of January 5, 1989, showed that the part was conforming.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the parts were minor nonconformances. The lack of a required chamfer was a major nonconformance. All parts in our sample were examined and none had the proper chamfer as required by the contract specifications. Industry experts contacted by the audit team agreed that bolts provided without the chamfers constituted a major nonconformance.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

MDIR Results: The contractor nonconcurred with the auditors' finding and stated that no defects were found.

Auditors' Response to the MDIR: After reviewing the MDIR, it appears that the contractor did recognize the nonconformance. The nonconformance was a chamfer angle out of tolerance by 1 degree. The contractor attributed this nonconformance to a light buildup on the plating. The Government Quality Assurance Representative did not feel that this deficiency would warrant rejection. We believed that the MDIR conclusions were inaccurate because the independent laboratory tests showed a minor nonconformance.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed the parts as fully conforming.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. There was no evidence to dispute the independent laboratory test results that some parts contained minor nonconformances, and the MDIR confirmed the existence of a minor nonconformance.

Sample Number: VS-5
National Stock Number: 5307-00-511-4828.
Nomenclature: Stud extension.

MDIR Results: Two MDIR's were performed on parts supplied by two separate contractors. The first contractor agreed that the parts were nonconforming and stated that the items will be replaced at no cost. The second contractor did not agree with the auditors' findings regarding dimensional nonconformances and requested additional samples to conduct hardness tests. The investigation was in progress.

Auditors' Response to the MDIR: We agreed with the MDIR results for the first contractor. The MDIR results for the second contractor were incomplete.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed minor nonconformances in the parts from both contractors.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The original test results and the acceptance of responsibility by the first contractor for the nonconforming parts material clearly demonstrated that test parts contained minor nonconformances. Since insufficient samples were on hand during the MDIR investigation at the second contractor's facility, hardness tests could not be accomplished. Consequently, the Logistics Center should refer to the independent laboratory test results that showed minor nonconformances.

Sample Number: VS-6
National Stock Number: 5310-00-496-1003.
Nomenclature: Washer insulator resistor.

MDIR Results: The contractor nonconcurred with the auditors' findings and stated that no defects were found. However, the contractor acknowledged that due to the size of the items, the parts could not be physically marked as specified on the drawing.

Auditors' Response to the MDIR: Failure to mark the parts as the drawing required was a minor nonconformance.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed the parts conformed with contract requirements.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. Parts not marked, as the drawing specified, were nonconforming and the nonconformance was minor. It appears that the drawing requirement for markings should be changed if marking the part was not feasible.

Sample Number: VS-7
National Stock Number: 5315-00-171-8241
Nomenclature: Pin, retainer ring.

MDIR Results: The contractor acknowledged the nonconformances and agreed to replace the parts at no cost.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Auditors' Response to the MDIR: We agreed with the results of the MDIR.

The Logistics Center's Conclusion: The Logistics Center's summary conclusion showed that the test results were unavailable. The Logistics Center's status report as of January 5, 1989, showed that the parts contained minor nonconformances.

Auditors' Response to the Logistics Center's Conclusion: We disagreed with the Logistics Center's summary conclusion that the test results were unavailable. The original independent laboratory test results and the contractor's acknowledgment of the nonconformances clearly demonstrated that the parts contained minor nonconformances.

Air Force Usage Data. The Air Force also provided its analysis of parts usage trends for the 46 sample parts included in the audit. Only five sample parts showed usage trends. According to the Air Force, these ". . . usage trends might warrant deeper evaluation." The Air Force made the following comments about the five sample parts:

sample number 4 - Usage in 6th preceding quarter (21); very little.

sample number 8 - Spastic usage recent quarters; slight uptrend.

sample number 31 - Spastic usage; heavy in 8th and 2nd quarters.

sample number 33 - Moderate usage; declining trend.

sample number VS-1 -Heavy usage by Navy 2nd, 3rd, 4th, 5th quarters.

Historical usage data on the demands for spare parts was maintained for the last 8 quarters of the most recent 2 years. The terms 6th, 8th, 2nd, 3rd, 4th, and 5th in the Air Force quotes refers to the prior period quarter of time that the demands for the spare parts occurred.

AUDIT RESPONSE TO AIR FORCE SUMMARY COMMENTS
(Continued)

Audit Response to Air Force's Usage Data. There can be many reasons why usage data do not reflect trends related to the sample numbers with nonconformances. We are providing three reasons. First, the Logistics Center's inventory may not have issued the sample parts with nonconformances to the Air Force bases that use the parts. Second, because many sample parts were gun parts, there may have been low usage of the guns and nonconformances may not have yet appeared. Third, the sample number parts with nonconformances may only reflect the quality of other parts in the inventory. If the other parts in the inventory were nonconforming, there would not be a trend because all the parts were used at the same rate. For the five sample parts that the Air Force stated had usage trends, it was interesting to note that sample nos. 8 and VS-1 had major nonconformances and Air Force usage data showed an uptrend and heavy usage, respectively. Sample no. 4 was conforming and showed very little usage. Sample nos. 31 and 33 had minor nonconformances and showed heavy and moderate usage, respectively. Overall, we disagreed with the Air Force because the usage data provided was not correlated to the time frames when the parts with nonconformances were either used or actually will be used in tactical systems.

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